OCTOBER 7, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

BCuAu

BCu

RBCuZn

BMg

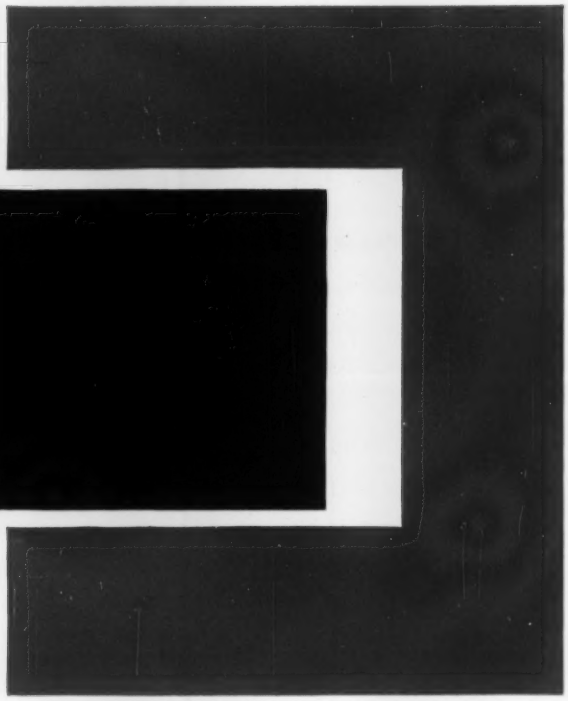
BNiCr

BAgMn

BAlSi

BCuP

BAg



Brazing Alloy Selector

Information to help you choose from over 400 filler metals . . . . Page 162

✔ Scoreboard: Who Is Producing Our Missiles —Page 119

✔ Component Buyers See Few Inventory Changes —Page 231

The Spirit of a Company

•

How do you measure or evaluate the spirit of a company?

By physical facts — size, number of plants, number of employees?

Or by accomplishments — the amount of sales, the outstanding installations, the new products?

Or by the intangibles — the reputation, the respect of the industries served, the interest of the company in their customers?

No one ever has defined specifically the spirit of a company, yet every company with which you do business has a certain identifying spirit.

•

What is the spirit of Aetna-Standard as we see it ourselves?

The ability to do a job well.

The courage to design equipment in the face of competitive bidding without diluting the ruggedness and the extra components for the sake of a price.

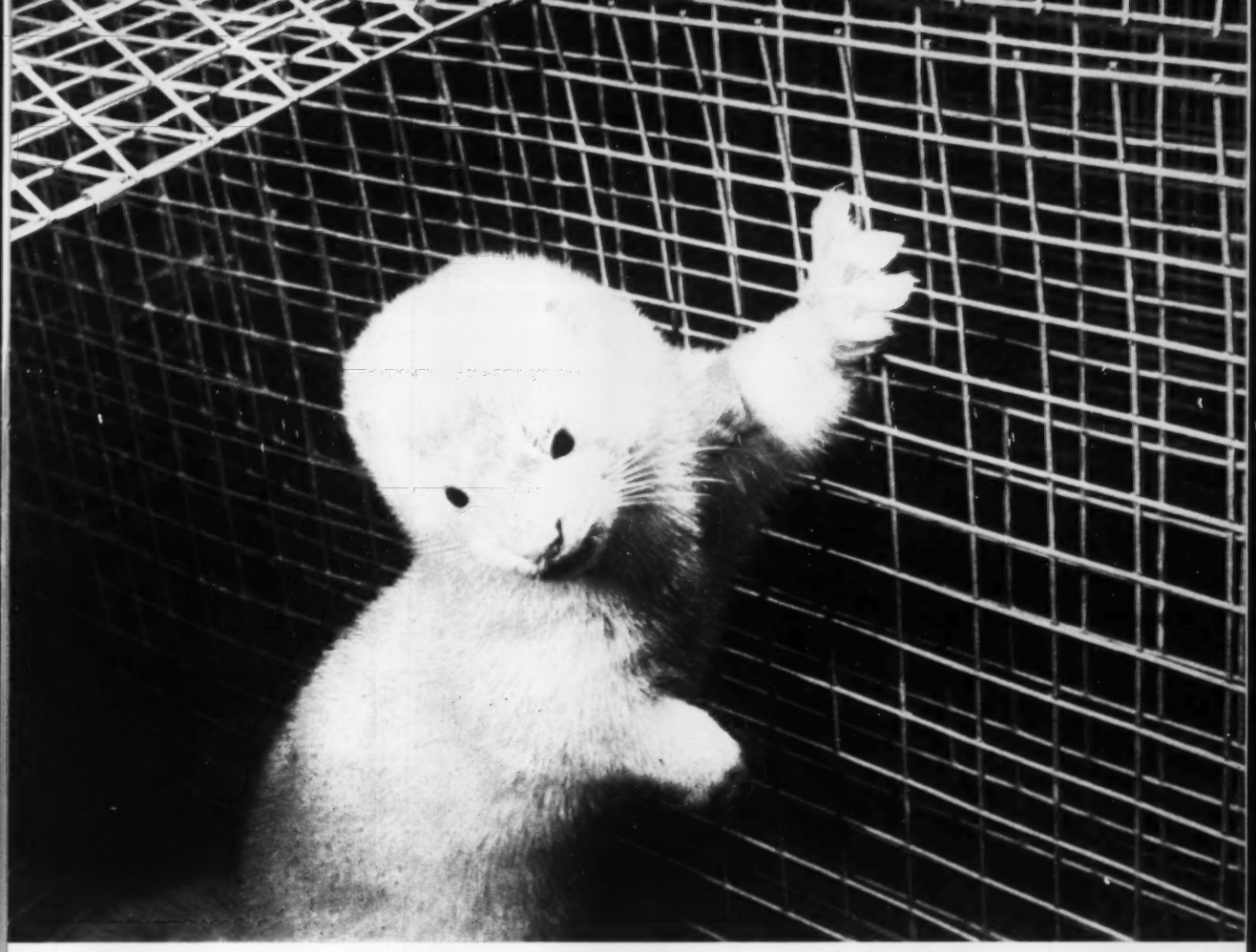
The strength to pioneer in ideas.

The perseverance to say "no" when "yes" would be much easier.

The awareness of the importance of customers.

The Aetna-Standard Engineering Company

Ellwood City, Pa. Pittsburgh, Pa. Warren, Ohio.



Someday the coat worn by this mink will sell for perhaps $70. Her pelt, known as cerulean mink, along with some 65 others, may go into a full-length coat tagged as high as $10,000.

Bethanized wire guards her $70 mink coat

When stylish, light-colored mink fur shows the slightest trace of rust stain, its value may be cut in half. This downgrading of the pelts—and the constant replacing of the rusted wire pens—adds up to a big loss for the mink ranchers.

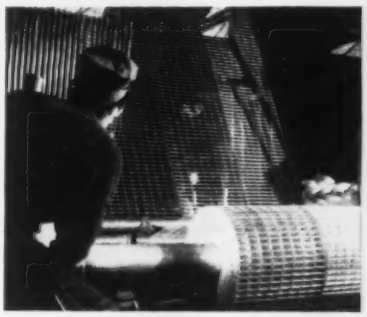
Mink pens made from ordinary galvanized steel wire just won't hold up under the abrasive wear of the animal's feet and the harsh corrosion caused by their body acid. Some years ago a manufacturer of welded wire fabric, was asked by a nearby rancher to see if an answer could be found.

It was decided that bethanized wire with an extra heavy coating of pure zinc would do the job if anything could. Some experimental pens were placed in service using the bethanized "C" coating. And after several years of normal use, it was obvious that the answer had been found. There was not one rust spot on the bethanized wire. And subsequent results have verified this test. As a result, more and more fur ranchers are enthusiastic users of fabric made from bethanized wire.

* * *

Bethanized wire has a smooth, uniform coating of pure zinc which is deposited electrolytically. In our unique process the zinc goes on atom by atom. There are no thin spots for corrosion to attack. Because of its 99.9-pct purity, the tightly bonded zinc is highly ductile and withstands severe forming.

We can supply bethanized wire in hard or soft temper, with light, medium, or heavy zinc coatings. We'll be glad to send you Folder 615 which gives more details. Write Publications Dept., Room 1037, Bethlehem Steel Co., Bethlehem, Pa.



Bethanized wire sparkles as welded-fabric is spooled in 100-ft rolls. This fabric assures long protection against corrosion because the uniform coating of pure zinc is tightly bonded to the steel.

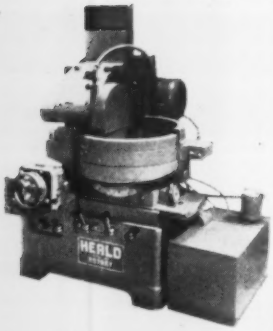
BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation
Export Distributor: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

Large work? Low RMS finish?
Here's a shining example.



The 30" Heald Model 361 Rotary does an outstanding surface grinding job

Take this case for instance. The column-type rotary Model 361-30" is designed to precision surface grind relatively large work. The wheel grinds on its periphery, producing a concentric finish highly desirable in certain applications. The 361 is now available with either a 24" or 30" magnetic chuck, and can easily handle work of the size shown above. This piece has a 2-4 R.M.S. finish and a flatness of .0001 in 30". Send for Bulletin 2-361-1.

IT PAYS TO COME TO HEALD!

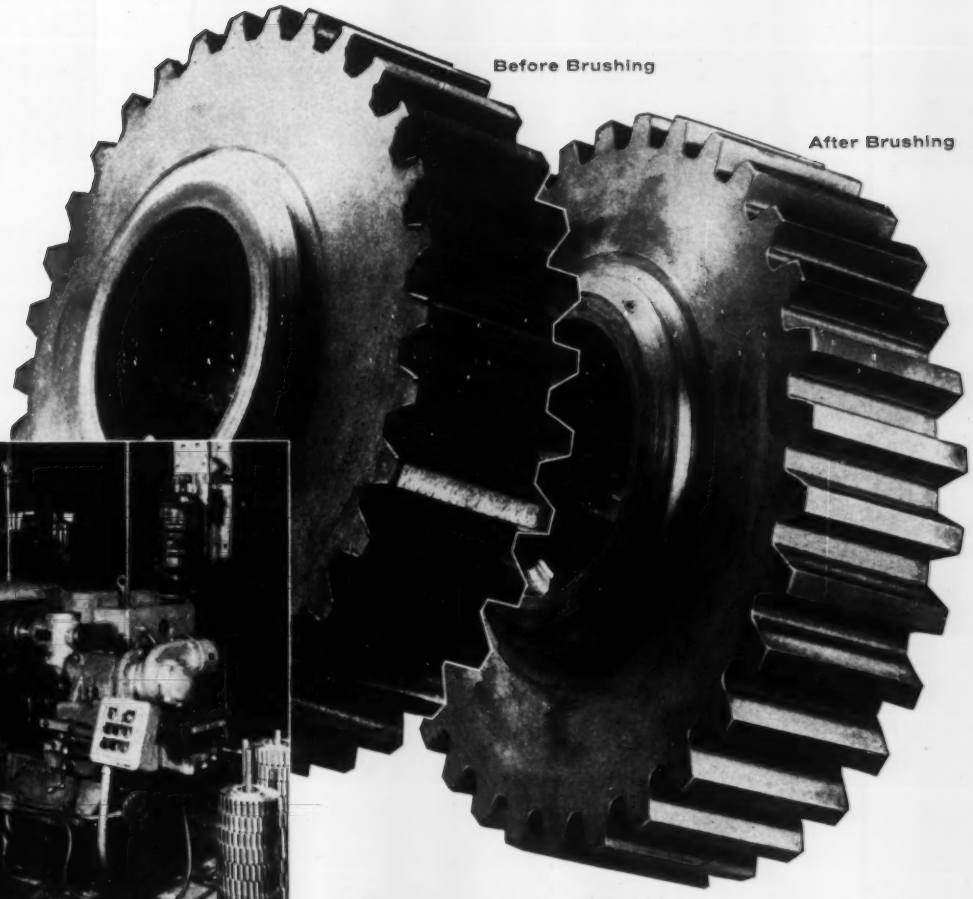
HEALD

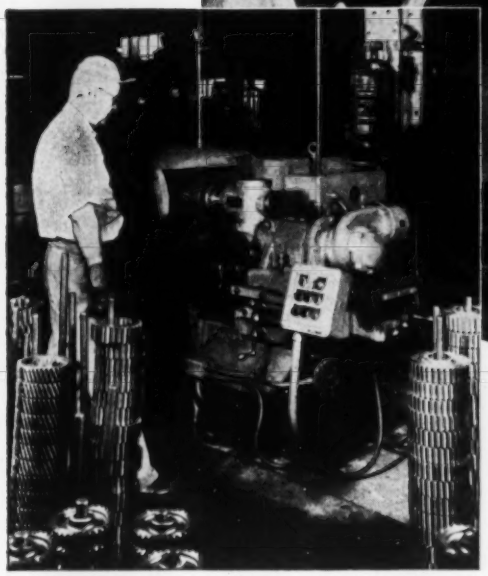
THE HEALD MACHINE COMPANY

Subsidiary of The Cincinnati Milling Machine Co.

Worcester 6, Massachusetts

Chicago • Cleveland • Dayton • Detroit • Indianapolis • New York





A leading machine company, supplying gears for mining and a variety of other heavy machinery, uses Osborn's Brushamatic 4 and a brushing cycle of 6 seconds a side to finish these gears in lots of 20 and up.

Pays Off...

25 for 1

REMOVING burrs from the teeth and internal spline of this gear was once a 5 minute, hand filing operation. Using Osborn Brushamatic® methods, only 12 seconds are required to remove these burrs. In addition, power brushing blends all surface junctures, reducing fracture-causing concentrations of stress.

An **O**sborn **B**rushing **A**nalysis, made in your plant and at no obligation, will show how *you* can improve quality while making similar savings in finishing time and cost. Write *The Osborn Manufacturing Company, Dept. G-60, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

OSBORN

BRUSHING METHODS • POWER, PAINT AND MAINTENANCE BRUSHES
BRUSHING MACHINES • FOUNDRY MOLDING MACHINES

Osborn Brushes

For Full Power when it's needed most, specify **gould** batteries...

Gould Industrial
Truck Battery
—America's Finest

Here's why: You know that an overload can cause an unusual drain on your batteries. At such times your batteries must be in "good health" or they may not survive the strain. Keeping batteries in "good health" is not difficult, all it takes are good routine checking procedures which give you a day-by-day record of a battery's condition. By consulting these records frequently you can always be sure of full power when it's needed.

An important part of the Gould service is to help you establish such a sound preventive maintenance program, and teach your battery maintenance personnel the importance of following recommended procedures. This is another reason why it pays you to specify Gould. Want more reasons? Write for booklet "... so you're going to buy an industrial battery." Gould-National Batteries, Inc., Trenton 7, N. J.

Always Use Gould-National Automobile and Truck Batteries

More Power to you from Gould

© 1957 Gould-National Batteries, Inc.

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October 7, 1957
Vol. 141 No. 15

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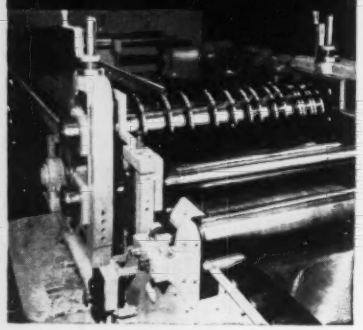
YODER SLITTING LINES



PAY BIG DIVIDENDS WORKING ONLY ONE DAY PER WEEK!

In one plant, two Yoder tube mills and about 50 punch presses are being supplied with slit strands by one Yoder Slitting Line operated an average of only *seven hours per week.*

In another plant, a Yoder slitting line, *operated from six to eight hours per week,* is supplying two intermittently operated roll forming machines with total requirements averaging 100,000 feet per week.

These typical examples demonstrate, first, the big potential output of a relatively small, inexpensive Yoder standardized Slitting Line and, secondly, its big profitability. Assume production of only 35 tons of slit strands per 8 hour shift, one day per week, and the total per year would be 1750 tons. Estimating the saving in slitting cost at only one-half cent per lb., the total annual saving would be $17,500.00.

Besides the big convenience of doing your own slitting, such savings will often repay the investment in a few months.

The Yoder Slitter Book **is a comprehensive treatise on slitter operation and economics, with time studies, cost analyses and other useful data. It is yours for the asking.**

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio, U.S.A.

ENGINEERING YODER MANUFACTURING SLITTING LINES

behind the scenes

The three gentlemen pictured above are, left to right: Richard Messner, Sal Marino, and sloppy ol' Shrdlu. Mr. Messner is chairman of the Direct Mail Advertisers' Association committee on awards; Mr. Marino is STEEL's go-go promotion director, and —hello, Shrdlu seems to have stepped out of the picture. Well, we're not concerned with him, anyway. The object of the illustration is to show Sal accepting a "Direct Mail Leaders" award for 1957 on behalf of STEEL, whose entry in Class No. 1, "Creating more effective personal sales contacts," wowed the direct mail boys.

Sal traveled all the way to the Sheraton Park Hotel, Washington, to accept the award, and the smile that wreathed his honest countenance seems to be a permanent fixture.

Dis Spelling Ve Mengled

It's fun to make mistakes when we receive delightful corrections. A reader who signs himself Walter von Popinjay, and who deliberately confuses us with Shelley's skylark, writes, concerning Friedrich Engels:

Shrdlu, bird thou never wert:
I suggest you don't know all the engles
When you spell Friedrich Engels as Engles.
In my dialectical book
This materialistic old schnook
Was no engel, from a rope should have dengled!

A Cold Deal

Roy W. Poe, sales manager, Tweco Products Inc., Wichita, Kans., recently asked permission to reprint Editor Walt Campbell's editorial, "The Parable of the Prices" (STEEL, July 15, p. 51). At the same time, Mr. Poe called the editor's attention to a little story that appeared in a Tweco sales bulletin, a story entitled "How To Be a Dead Indian." He ventured to think that Walt would like it, and Walt ventured to think that we would like it, and, fearful to break the chain, we venture to think you will like it. Here it is:

In the early pioneer days of the West, Jeremiah Knausenheimer and his family set out from Pennsylvania to find a new home. They visited a friendly Indian village to find a guide to take them over the mountains. Three braves agreed to make the trip, but Jeremiah wanted only one. "What," he inquired, "is a fair price for the trip?"

"Three bushels of corn and three woolen blankets," they all replied.

"Too much," Jeremiah grumbled. "Who will go for less?"

After thinking it over, one brave agreed to go for two bushels of corn and three blankets; another settled for two bushels of corn and two blankets. The third agreed to go for one bushel of corn and one blanket, so Jeremiah hired him.

The trip over the mountains was long and rough. The weather was freezing, and it took longer than all had expected. After weeks of struggle, the Knausenheimers were still well-fed and warm, for they had gone well-prepared, but the poor Inddian was starved and frozen, his corn gone, and his blanket worn to a rag. As they stood about the deathbed of the unhappy brave, Jeremiah asked him: "Why is it that you agreed to take this trip as a guide when you knew that you could never survive on the fee you agreed to take?"

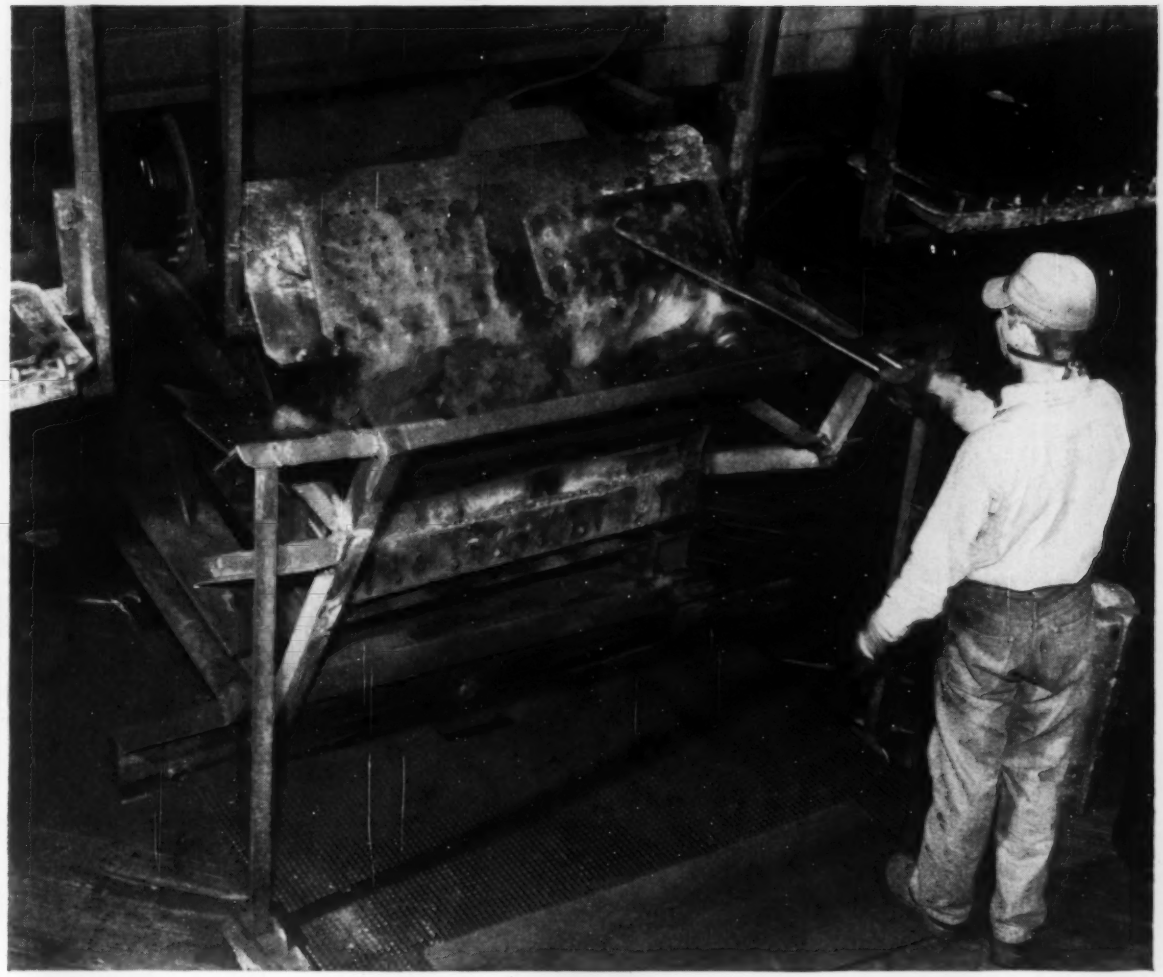
The dying Indian murmured: "Me know me cannot live on one bushel corn and one blanket, but me need work, and me good Indian."

Thus came about the saying that the only good Indian is a dead Indian.

Shrdlu

(Metalworking Outlook—Page 113)

B.F.Goodrich report:



Searing hot sand burned out belt in 3 months

B. F. Goodrich improvements in rubber brought extra savings

Problem: At this foundry the sand shaken from those red-hot castings drops on an under-the-floor conveyor belt and is on its way to being used again. But the extremely hot sand baked the belt hard, made it crack and break. The belt needed constant repairs, had to be replaced every three months.

What was done: When a B.F.Goodrich salesman heard of the problem, he suggested a new belt, called Solarflex, specially designed by B.F.Goodrich engineers to handle hot materials. This belt is made of a special rubber that stays soft and pliable at temperatures that cause other belts to harden, crack and finally break down.

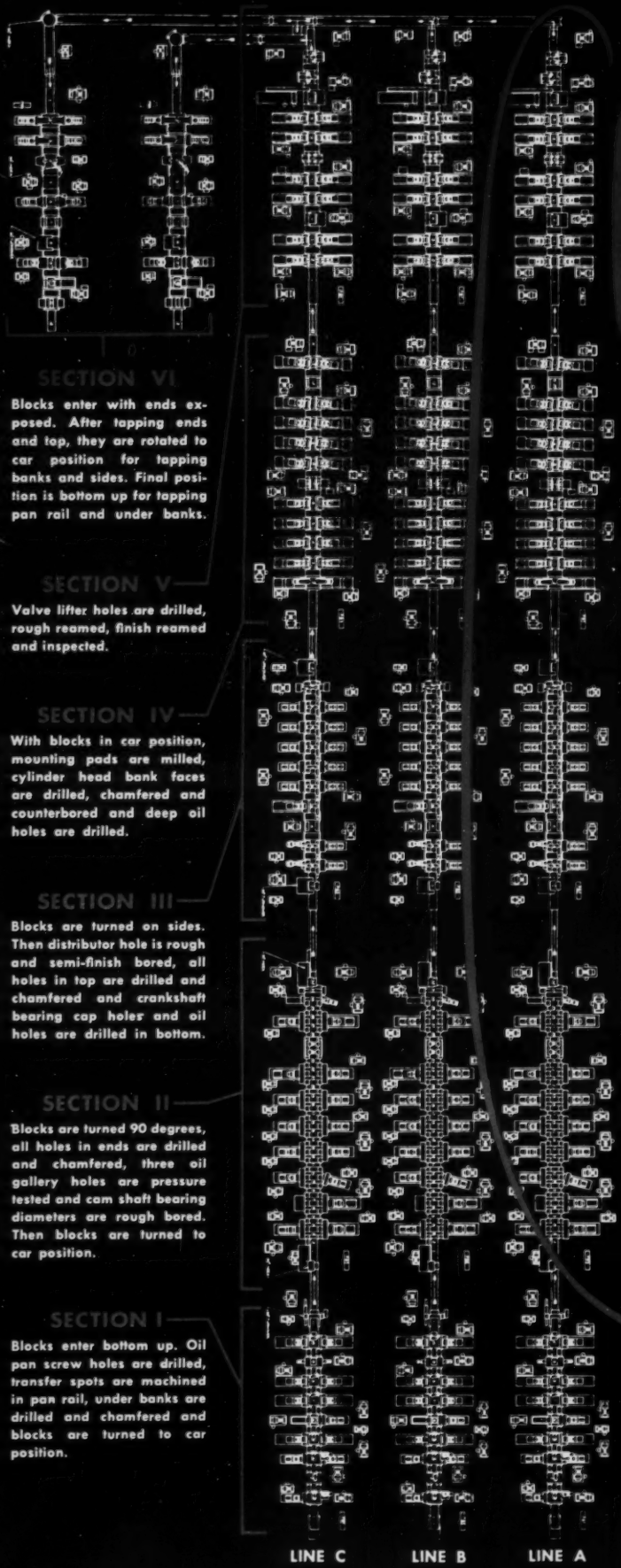
Savings: The B.F.Goodrich Solarflex belt has now given more than 1½ years of troublefree service—five times that of previous belts—and still shows no sign of wear. In fact, the plant superintendent says he expects at least two more years' use from the belt.

Where to buy: Your B.F.Goodrich distributor has the exact specifications on the belt that solved the problem in this foundry. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Department M-131, Akron 18, Ohio.*

B.F.Goodrich

INDUSTRIAL PRODUCTS

1300 ft. Transfer-matic Performs 2291 Operations on V-8 Blocks



SECTION VI

Blocks enter with ends exposed. After tapping ends and top, they are rotated to car position for tapping banks and sides. Final position is bottom up for tapping pan rail and under banks.

SECTION V

Valve lifter holes are drilled, rough reamed, finish reamed and inspected.

SECTION IV

With blocks in car position, mounting pads are milled, cylinder head bank faces are drilled, chamfered and counterbored and deep oil holes are drilled.

SECTION III

Blocks are turned on sides. Then distributor hole is rough and semi-finish bored, all holes in top are drilled and chamfered and crankshaft bearing cap holes and oil holes are drilled in bottom.

SECTION II

Blocks are turned 90 degrees, all holes in ends are drilled and chamfered, three oil gallery holes are pressure tested and cam shaft bearing diameters are rough bored. Then blocks are turned to car position.

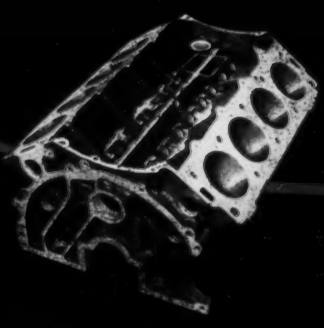
SECTION I

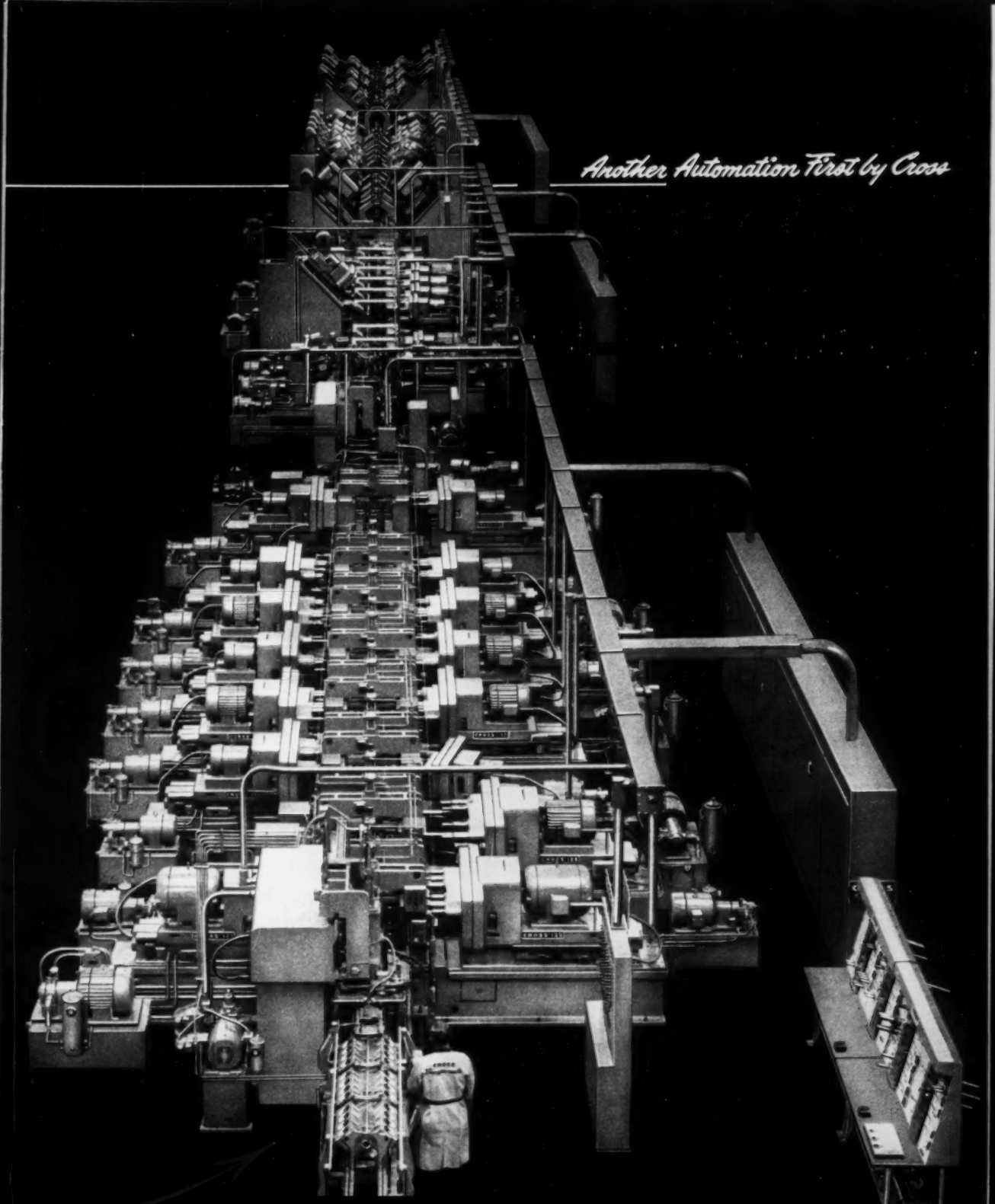
Blocks enter bottom up. Oil pan screw holes are drilled, transfer spots are machined in pan rail, under banks are drilled and chamfered and blocks are turned to car position.

LINE C LINE B LINE A

Here is the answer to the automobile industry's insistent request for machine tools which will reduce the cost of model changes and shorten change-over periods. This giant "Sectionized" Transfer-matic is constructed with an entirely new set of Cross building blocks and applies new concepts of standardization to machine bases, transfers, fixtures and heads.

- ★ Capacity to machine any passenger car engine block.
- ★ 270 stations in 17 sections, each with independent controls; sections operate automatically as blocks are made available; any section may be stopped without interrupting production of others.
- ★ 2291 operations on 185 blocks simultaneously.
- ★ Rated capacity of 350 cylinder blocks per hour.
- ★ Cross Machine Control Units with Toolometers for efficient tool programming.
- ★ Pre-set tools to reduce downtime.





Another Automation First by Cross

Photo shows
Sections II, III, IV
and V of Line A.

Established 1898

THE CROSS CO.

First in Automation

PARK GROVE STATION • DETROIT 5, MICHIGAN

KILL RECORD VAULT FIRES FAST

with a Kidde automatic carbon dioxide fire extinguishing system . . . the fastest, safest 'round-the-clock fire protection you can buy. At the first hot breath of fire, Kidde's rate-of-temperature-rise actuators trigger the system. Instantly, clean carbon dioxide smothers fire, vanishes into thin air. Leaves no mess. The Kidde system features all operating parts completely enclosed for safety. No falling weights, no clumsy mechanical triggering methods. Pressurized, no outside power needed. Visual indicators to show if system is set or released. Easy testing of all operating parts. No parts to replace after operation or test. For more information write for Kidde's automatic carbon dioxide fire extinguishing systems booklet today.

Kidde (K Kidde)

Walter Kidde & Company, Inc.
1060 Main St., Belleville 9, N. J.
Walter Kidde & Company of Canada Ltd., Montreal—Toronto

LETTERS
TO THE EDITORS

Maximizing Machine Tools

Your special feature article, "How To Get More from Machine Tools" (insert in Sept. 23 issue), is informative to an accountant interested in cutting costs.

Please send an extra copy.

Albert F. Deres
Plant Accountant
Delaware Plant
Denison Engineering Div.
American Brake Shoe Co.
Columbus, Ohio

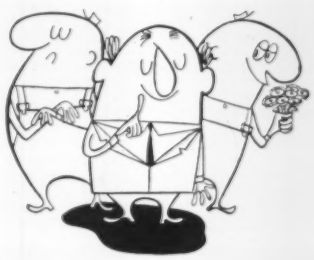
We would like to congratulate you on your article. We sell cutting tools through our warehouse steel department and think this article would be of great value to our sales personnel. We could use 50 copies.

C. H. Nesbitt
Manager
Specialty Steels
O'Neal Steel Inc.
Birmingham

Please forward a copy. We read this article with interest and desire an extra copy for our files.

K. E. Orsborn
Assistant Purchasing Agent
Philips & Davies Inc.
Kenton, Ohio

Knowhow for Supervisors



Your Program for Management article, "Dealing with Workers" (Sept. 16, Page 119), was excellent.

Although we have been attempting to practice the things suggested, we have found it difficult to get many of these points across to our supervisors. I believe your article will aid us materially.

We would appreciate 15 copies.

George Neumann
Vice President
Lehigh Structural Steel Co.
Allentown, Pa.

Please send ten copies. We find it interesting and educational.

H. J. Wood
Manager, Section No. 11
Defense Electronic Products
Radio Corp. of America
Camden, N. J.

Cleverly Written, with Moral

Congratulations on the editorial, "Parable of the Prices" (July 15, Page 51). It is not only cleverly written but contains a moral that applies to all of us connected with the steel industry. May we reprint it?

We ran a little story in this same vein entitled "How To Be—a Dead In-

(Please turn to Page 12)

Wheels coated with ALUNDUM abrasive give housing covers a fine polish, faster and for less money — like other Norton "Touch of Gold" grains that cover the widest range of polishing operations. ▶

Setting up the wheels shown at right is an easy job. The high capillarity of ALUNDUM polishing grains improves and speeds up the wetting process with glue or cement.

How polishing costs are being cut...NOW

Trend to wheels set up with ALUNDUM abrasive is spreading the money-saving "TOUCH OF GOLD"*

Many plants where polishing jobs are important find that a change-over to wheels set up with Norton ALUNDUM abrasives results in better, faster, lower-cost polishing.

In particular, preferences for S and R type grains are increasing rapidly. The S type, available in 14 to 90 grit sizes, is specially surface-treated to give the abrasive much greater adhesion to glue or cement. The R type, made in 100 to 240 grit sizes, also gets a special surface treatment, to improve its adhesiveness for use with glue only.

Typical advantages common to all ALUNDUM polishing grains include:

- **Uniform grain shape,** that assures a fast, uniform cutting action.
- **Uniform grain sizings,** with no oversize grains that mar the finish, no undersize grains to loaf on the job.
- **High capillarity,** assuring the easy absorption of adhesive that means longer lasting, better performing set-up wheels.

The booklet "Setting Up Metal Polishing Wheels and Belts" contains valuable facts on the various types of ALUNDUM grain . . . on the applications of canvas, leather or wooden wheels . . . and on the best means of preparing wheels, with cement or glue. Ask your Norton distributor for it. Or write to NORTON COMPANY, General Offices, Worcester 6, Mass. Plants and distributors all around the world.

*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries

G-334

NORTON

ABRASIVES

Making better products . . . to make your products better

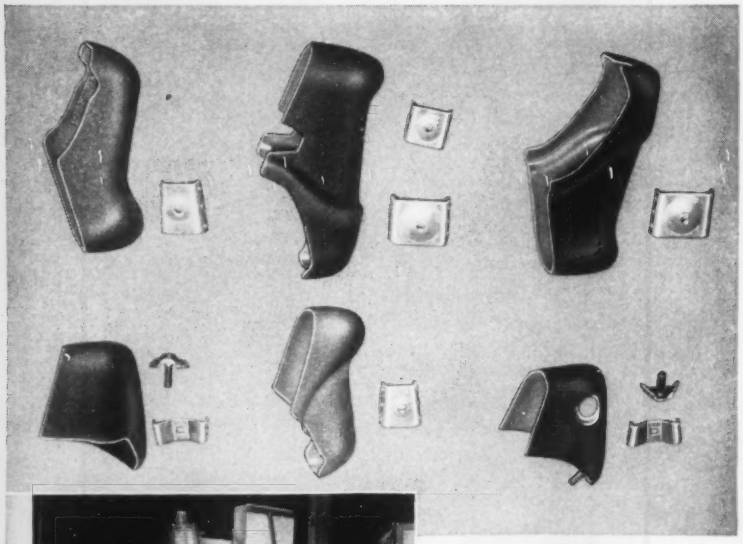
NORTON PRODUCTS

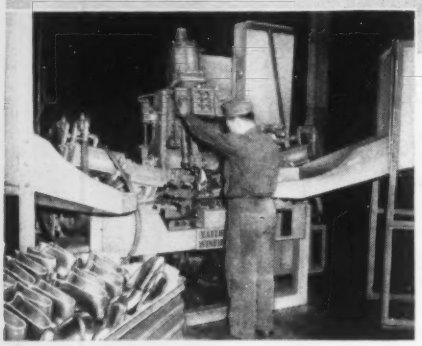
Abrasives • Grinding Wheels • Grinding Machines • Refractories

BEHR-MANNING DIVISION

Coated Abrasives • Sharpening Stones • Behr-cat Tapes

1 specially-tooled T-W welder assembles 15 bumper guards





This custom-built projection welder assembles 15 different models of auto bumper guards at a rate of 300 per hour. One or two mounting brackets are projection-welded on both sides of each guard. Simplified tooling changeover has cut down time 50%.

Specially-designed resistance welders speed assembly of many products that are similar — yet different. Custom tooling provides the answer. Designed for rapid changeover, special tooling reduces down time and lowers unit cost. It also permits economical modification for producing redesigned models. The result is a savings in capital investment and operating costs. For information on reducing your assembly costs now — and year after year, call the nearest Taylor-Winfield office, listed below.

The **TAYLOR-WINFIELD** *Corporation*
WARREN, OHIO

ELECTRIC RESISTANCE AND ARC WELDING MACHINES

Sales and Service

CHARLOTTE • CHATTANOOGA • CHICAGO • CLEVELAND • DALLAS
DAYTON • DENVER • DETROIT • LOS ANGELES • PHILADELPHIA
PORTLAND, OREGON • ST. LOUIS • STAMFORD
OAKVILLE AND WINDSOR, ONTARIO

LETTERS

(Concluded from Page 10)

dian," in our sales bulletin some time ago.

Dozens of magazines cross my desk every week. May I tell you that for interesting and informative business reading, STEEL is number one on my list.

Roy W. Poe
Sales Manager
Tweco Products Inc.
Wichita, Kans.

• *Permission granted.*

Aids Steelman in Manila

Please send a copy of your article, "Cold Treatment Ups Workability" (Aug. 5, Page 93). Since it is related to our business, we find it interesting and would like a copy for our library.

William E. Cranker
General Manager
American Machinery & Parts Mfg. Inc.
Manila, P. I.

Worker Performance Appraisal

We would like 100 copies of the article, "How To Be a Better Boss" (Sept. 23, Page 90).

We compliment you on this article. It is good, and we want to give it to our supervisors.

S. E. Dyke
General Manager
Fuller Co.
Subsidiary of
General American Transportation Corp.
Catasauqua, Pa.

May we request two copies. This was an excellent article, and it will be of great help.

J. A. Pruessner
Manager
Building, Equipment & Utility Maintenance
Sandusky Foundry & Machine Co.
Sandusky, Ohio

I should appreciate a copy. I found it most interesting and would like to pass it on.

J. J. Lennon Jr.
Manager of Sales
District Sales Office
United States Steel Corp.
Buffalo

Steel Distributor Problems

It was a pleasure to read your story, "Troubles in Distribution" (Sept. 9, Page 74), concerning the problems and opportunities of steel distributors. We appreciate the interest you have shown in our association programs.

John E. Doxsey
Assistant Secretary
American Steel Warehouse Association Inc.
Cleveland

Prestressing of Tubing

Would you please advise where further information on prestressing of tubing assemblies may be obtained? This technique was discussed in the Technical Outlook of your Aug. 26 issue (Page 67).

Carson Eckmann
Western Pneumatic Tube Co.
Kirkland, Wash.

• *Ask for "Improving Fatigue Life of Formed Stainless Steel Hydraulic Tubing by Prestressing" (PB 121969, $1.50) from Office of Technical Services, Department of Commerce, Washington 25, D. C.*

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"SCOTCH" Brand Plastic Tape takes no drying time, wears up to 5 times longer

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The problem of selecting the proper die is constantly recurring, and many times calls for the best technical skill and accumulated experience available. The Cincinnati Shaper Company offers complete facilities for manufacturing hundreds of dies, for the forming of a variety of products. Also available are the prompt services of our Application Engineers, a department thoroughly experienced and equipped to engineer the special dies you may require.

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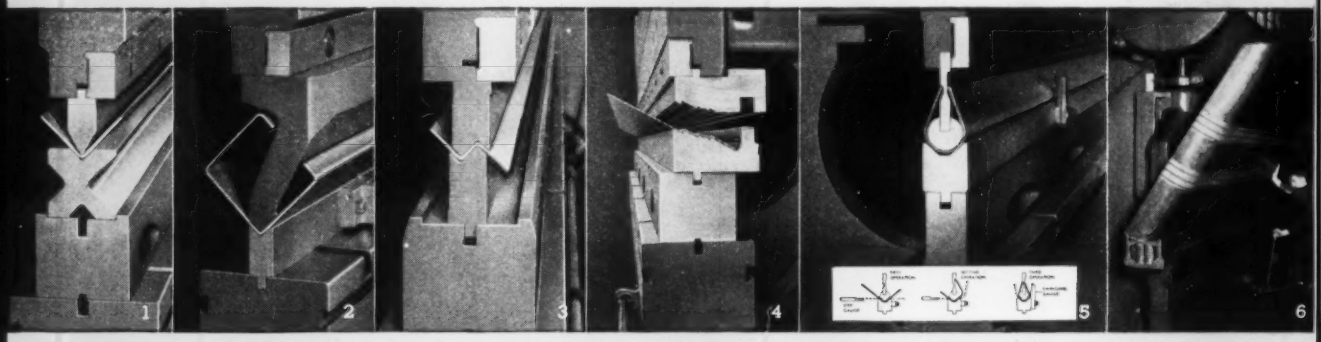
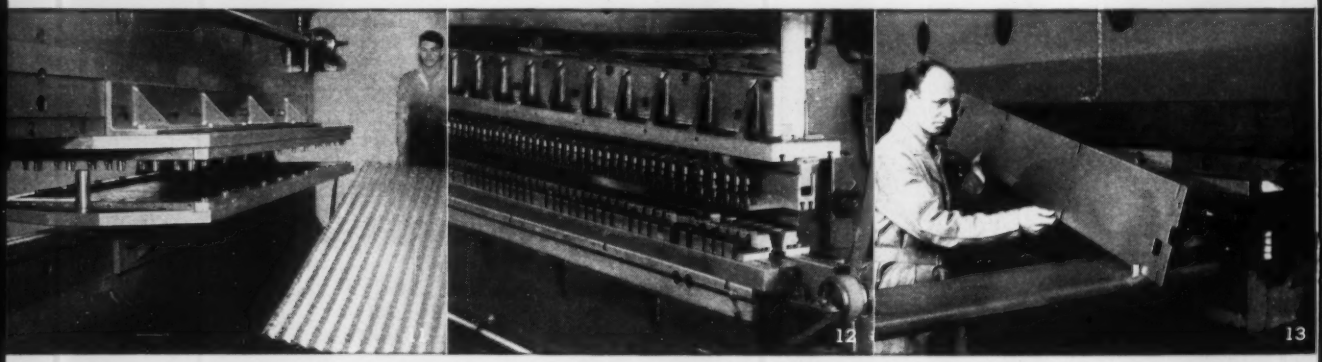
Our Application Engineers stand ready to give your production problems individual attention. They will aid you in the selection of proper punching equipment, if punching is your problem. A background of 30 years of widely varied experience is represented in this department, in literally every field associated with our machines.

To permit our Application Engineers to be of maximum service, as much information as possible should be given when sending us an inquiry or an order. Small details such as angles and radii on even the simple dies depends on such data. With complete information we will be able to make sound recommendations on methods



A typical 4-way die, equivalent to 4 single vee-dies, is shown in photo 1. Photos 2 and 3 show gooseneck and offset dies, respectively. A special die for producing 16 gauge molding is shown in photo 4.

The closed U bend shown in photo 5 is formed in 3 hits. Photo 6 shows a large truck body panel being formed.



Tooling for punching grain bin sheets is mounted on special bolsters in photo 11 Spring plungers are used for strippers. Photo 12 shows a double row punching setup. Gags are used to give different hole groupings. Four edges of a control cabinet blank are punched and notched on the setup shown in photo 13.

THE CINCINNATI SHAPER CO.

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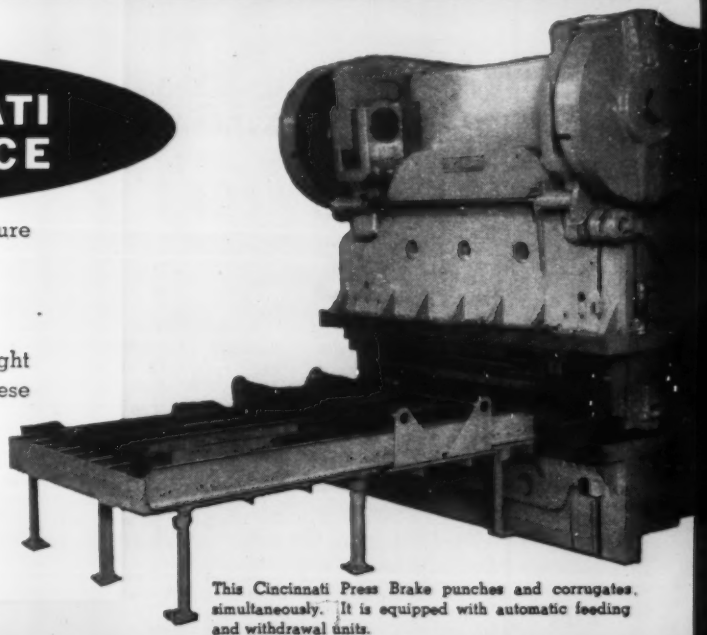
A COMPLETE CINCINNATI ENGINEERING SERVICE

and die design, as well as an estimate of the pressure that will be required.

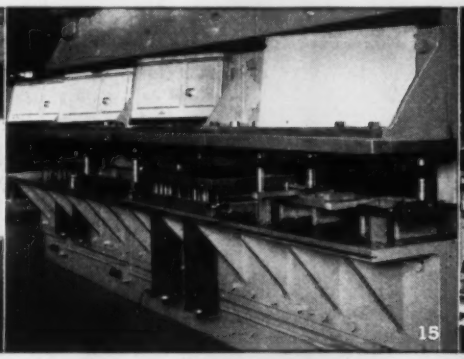
DIE MANUFACTURING

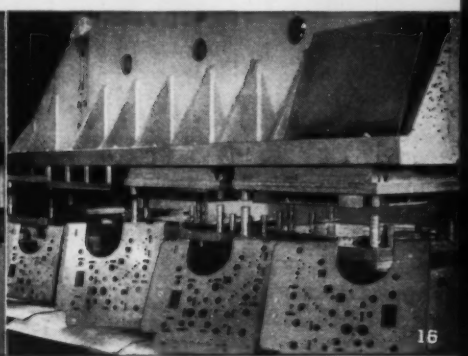
Dies cannot be classified as "standard" even for right angle bends, since there are many designs for these dies alone. Therefore, we do not stock finished dies. Instead, we carry a large stock of brake die steel. Our machining, assembling and testing facilities are ample for producing high quality, fully tested dies for any Press Brake work.



This Cincinnati Press Brake punches and corrugates simultaneously. It is equipped with automatic feeding and withdrawal units.

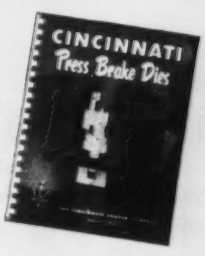
The dies shown in photo 7 form corrugated culvert sections in successive hits. Photo 8 shows conical sections being formed with standard dies. Steel roof decking is made with the "double-decker" dies shown in photo 9. The setup shown in photo 10 produces 2 miles of galvanized gutter per hour.





The progressive die setup shown in photo 14 is used for punching and drawing switchboard parts. Photo 15 shows a progressive die setup for making refrigerator top components. Pressure for draw operation is provided by rubber cylinders. Photo 16 shows a progressive die setup for producing television chassis.

The photos on these two pages show just a few samples of the Press Brake tooling and material-handling equipment designed and furnished by the Cincinnati Shaper Company. For more information, write Department C for Catalog D-2.



COLD HEADED FASTENERS COST LESS

and usually give better performance

The designer need not be restricted to standard fastener sizes when they do not meet the requirements of his application. It is often much less expensive to specify a rivet, nail, screw, pin or stud to meet the task exactly as the application requires, than it is to compromise its function for the sake of "standards." In this regard, we offer the equally important advantages of flexibility according to our customers' design changes and production by high speed, quantity techniques. While there is nothing mysterious about the cold heading process, experience has proved it to be of inestimable value for getting maximum quality and output at a minimum cost. While the really spectacular advantages in cost show up in runs of several thousand pieces, we are also able to take care of your short run requirements. We welcome and expect manufacturers to come to us for advice and assistance concerning their fastener problems.

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for production men

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The 60″ Electrodex table is equipped with a master index ring with two rows of bushings, 96, 49, and 8 indexes respectively. The three heads can be programmed to the indexing of the table.

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What about indirect labor, plant space, supervisory time, and other overhead? Will we be merely spreading our overhead over a larger base? Or will we be increasing it?

If we decide to buy . . .

Can our suppliers make a reasonable profit at a price that's right for us?

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Put their high productivity in your plant, and their high earning rate will quickly justify your "make" decision. On the other hand, if your supplier is equipped with Avey machines, the chances are good that you can buy at a low unit cost and still feel comfortable about his profits.

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decision

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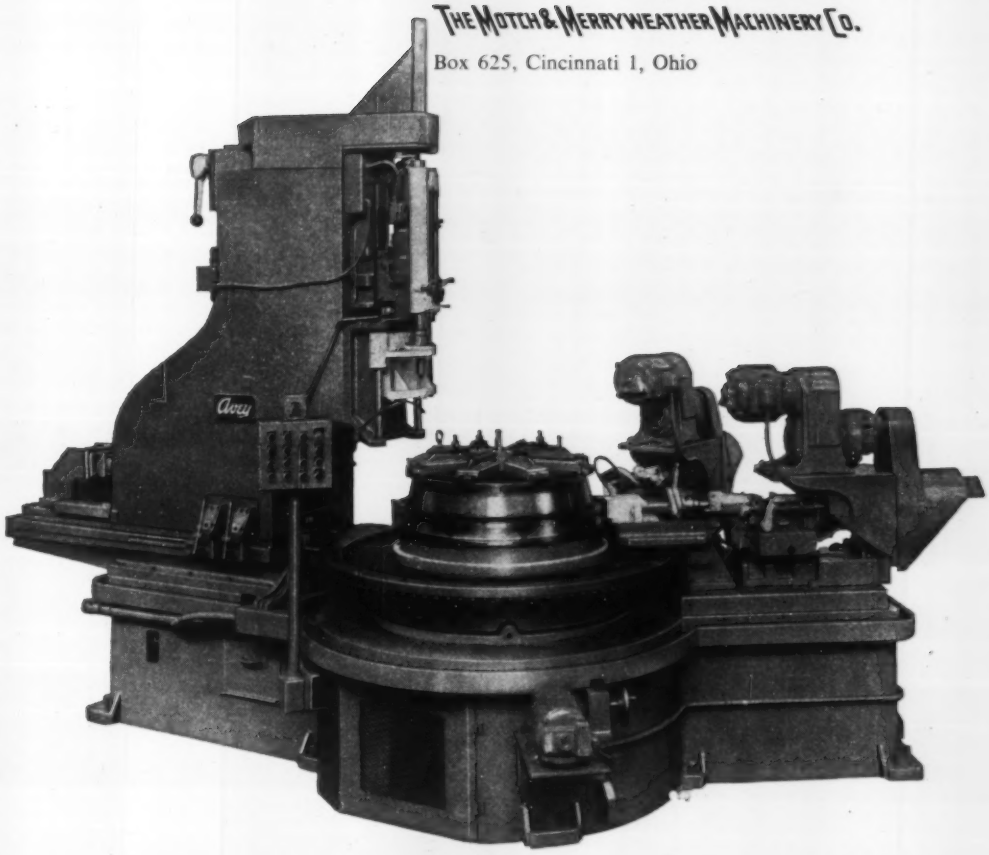

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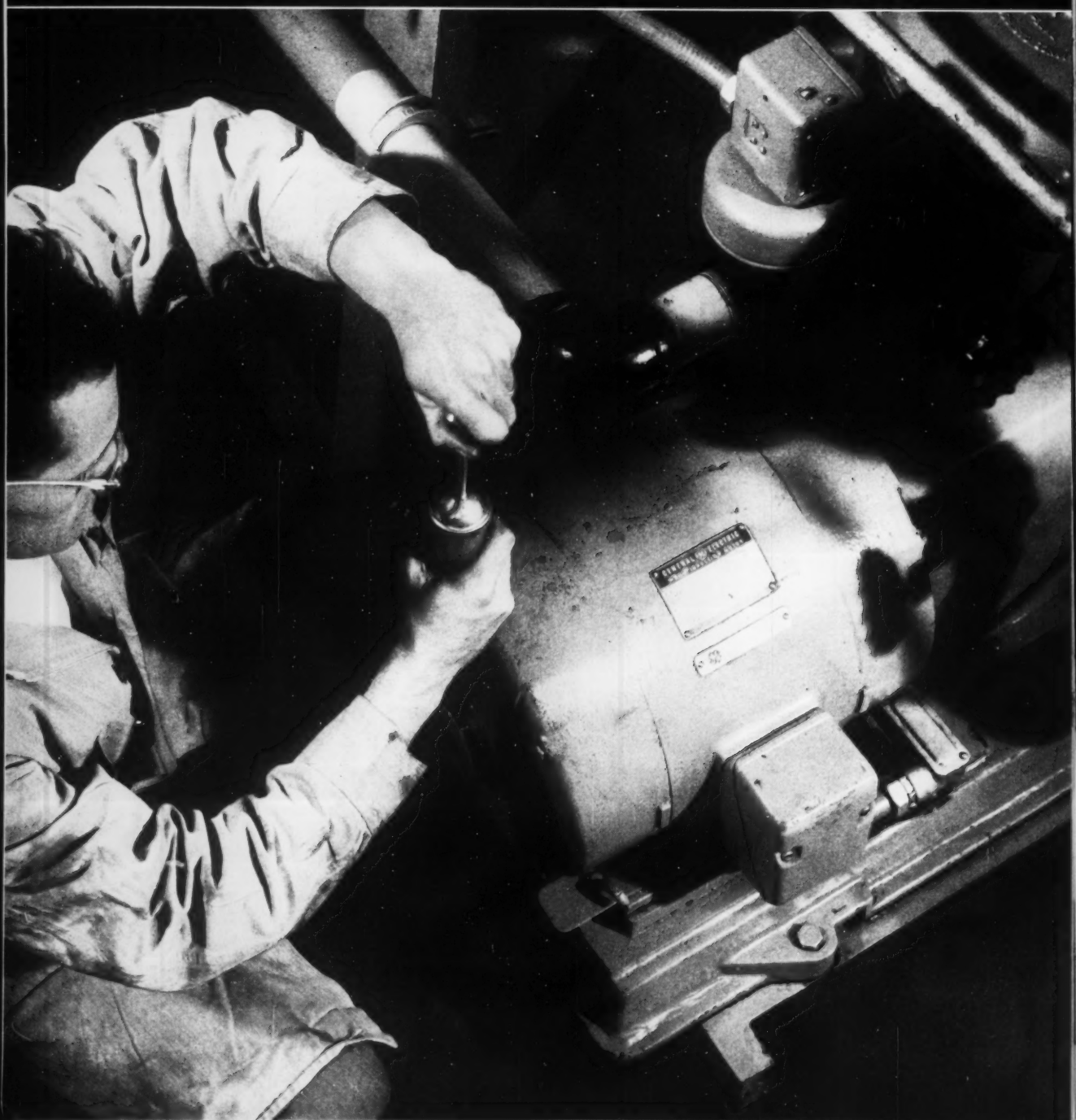

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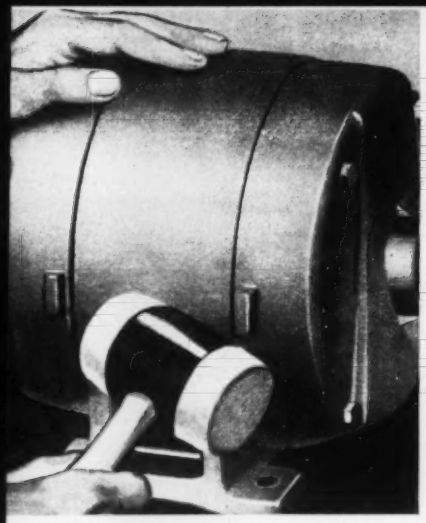

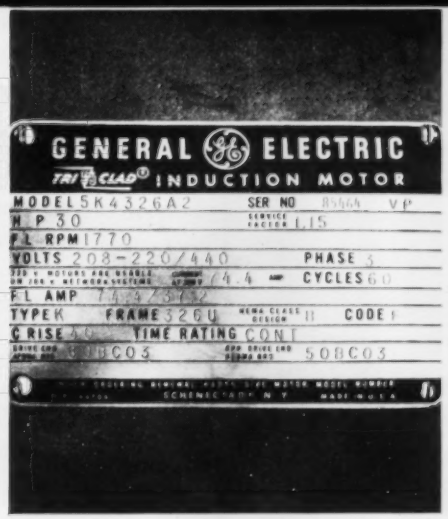

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EASIER TO INSTALL, Tri-Clad '55' motors use Perma-numbered leads to simplify wiring, speed motor hook-up. Numbers are stamped on terminals and printed on every half-inch of Geoprene® leads.

immediate shipment . . . all ratings

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EASE OF MAINTENANCE, however, is not the whole Tri-Clad '55' motor story. Experienced G-E motor engineers have used revolutionary materials and the most modern production and testing facilities to provide a motor that is not only easier to maintain, but also more reliable and easier to install.

Formerly available only to 30-hp, these proven Tri-Clad '55' motors are now available for immediate shipment—usually from nearby warehouse stocks—up through 125-hp.

FOR FULL INFORMATION on the complete Tri-Clad '55' motor line contact your nearest G-E Apparatus Sales Office or Distributor.

Section G891-7
GENERAL ELECTRIC COMPANY
Schenectady 5, New York

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☐ **FREE BULLETIN (GEA-6602) describes advanced features of new Tri-Clad '55' motors through 125-hp.**

☐ **FREE SLIDE RULE (GEN-148) to determine weight and space-saving benefits of new Tri-Clad '55' motors.**

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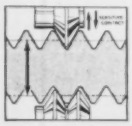

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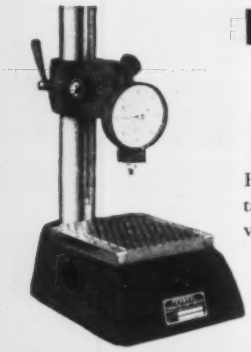

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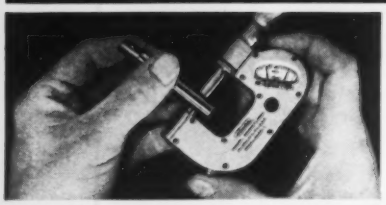

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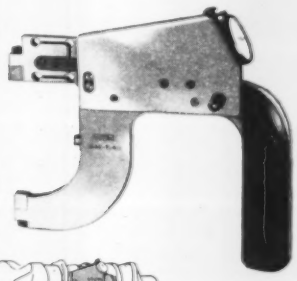

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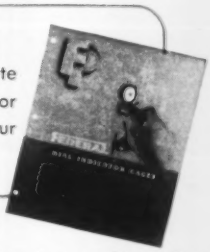

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CALENDAR OF MEETINGS

Oct. 7-9, American Society of Lubrication Engineers and American Society of Mechanical Engineers: Joint lubrication conference, Royal York Hotel, Toronto, Ont. Information: 84 E. Randolph St., Chicago 1, Ill. Administrative secretary: William P. Youngclaus.

Oct. 7-9, National Electronics Conference Inc.: Annual meeting and show, Sherman Hotel, Chicago. Conference's address: 84 E. Randolph St., Chicago 1, Ill. Executive secretary: J. S. Powers.

Oct. 7-10, American Institute of Steel Construction Inc.: Annual meeting, Del Coronado Hotel, Coronado, Calif. Institute's address: 101 Park Ave., New York 17, N. Y. Executive vice president: L. Abbett Post.

Oct. 7-11, American Institute of Electrical Engineers: Fall general meeting, Morrison Hotel, Chicago. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Oct. 9-11, Symposium on Vacuum Technology: Somerset Hotel, Boston. Sponsor: Committee on Vacuum Techniques, Box 1282, Boston 9, Mass.

Oct. 9-11, Gray Iron Founders Society Inc.: Annual meeting, Drake Hotel, Chicago. Society's address: National City-E. 6th Bldg., Cleveland 14, Ohio. Executive vice president: Donald H. Workman.

Oct. 9-11, Society for Experimental Stress Analysis: Annual meeting, Hotel El Cortez, San Diego, Calif. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary-treasurer: W. M. Murray.

Oct. 12-17, Conveyor Equipment Manufacturers Association: Annual meeting, Grand Hotel, Point Clear, Ala. Association's address: One Thomas Circle, Washington 5, D. C. Executive vice president: R. C. Sollenberger.

Oct. 13-16, Rail Steel Bar Association: Fall meeting, Western Hills Hotel, Ft. Worth, Tex. Association's address: 38 S. Dearborn St., Chicago 3, Ill. Secretary: W. H. Jacobs.

Oct. 13-17, Pressed Metal Institute: Annual meeting, Castle Harbor, Bermuda. Institute's address: 3673 Lee Rd., Cleveland 20, Ohio. Managing director: H. A. Daschner.

Oct. 14-16, Truck Body & Equipment Association Inc.: Annual meeting and exhibit, Atlanta-Biltmore Hotel, Atlanta. Association's address: 1616 K St. N. W., Washington 6, D. C. Secretary: Arthur H. Nuesse.

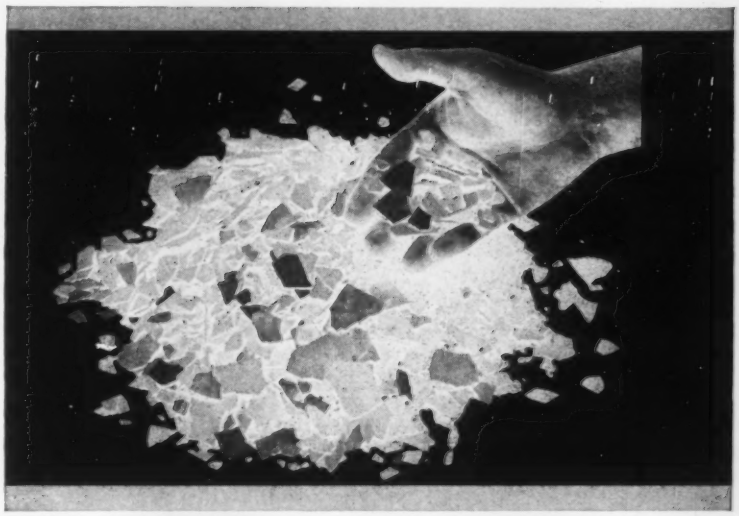
Oct. 14-17, Wire Association: Annual convention and exhibit, LaSalle Hotel, Chicago. Association's address: 453 Main St., Stamford, Conn. Executive secretary: Richard E. Brown.

Oct. 16, American Iron & Steel Institute: Regional technical meeting, South Shore Country Club, Chicago. Institute's address: 150 E. 42nd St., New York 17, N. Y. Secretary: George S. Rose.

Oct. 17-18, Magnesium Association: Annual convention, Biltmore Hotel, New York. Association's address: 122 E. 42nd St., New York 17, N. Y. Executive secretary: Jerry Singleton.

Oct. 17-20, American Society of Industrial Designers: Annual national convention, Ojai Valley Inn, Ojai, Calif. Society's address: 48 E. 49th St., New York 17, N. Y. Executive secretary: Sally G. Swing.

new... booming... stainless steels call for alloy purity



and ELECTROMANGANESE® has it

Lower cost . . . better mechanical properties . . . and improved appearance are giving tremendous impetus to the new high-manganese stainless steels. Best of all, for those who have been working in the old high-nickel alloys, the new 200 Series requires no change in production operations, and possibly effects some savings.

But—high manganese content means *pure* manganese . . . electrolytic manganese. Most of the new alloys cannot tolerate more than a trace of carbon, phosphorous, or lead. Foote Electromanganese, with 99.93% manganese content, gives you this purity. Hydrogen is as low as 150 ppm, and even this can be reduced to 7.5 ppm in a *Hydrogen-Removed* Grade. Nitrided manganese is available in Foote's high-purity Nitrelmang®. But just as important as purity, and as a direct result of it, these Foote alloying agents enable you to get the necessary manganese content in the most economical way.

If you want to exploit these promising new steels, one of our engineers will be glad to contribute Foote's knowledge of more than 17 years experience in electrolytic manganese alloying. A letterhead request will bring information promptly from our Technical Literature Department, Foote Mineral Company, 411 Eighteen West Chelten Building, Philadelphia 44, Pa.

Foote MINERAL COMPANY

SALES OFFICE: *Electromanganese Div., Knoxville, Tenn.*
RESEARCH LABORATORIES: *Berwyn, Pa.*
PLANTS: *Cold River, N. H.; Exton, Pa.; Kings Mountain, N. C.; Knoxville, Tenn.; Sunbright, Va.*

ELECTROLYTIC MANGANESE METAL • WELDING GRADE FERRO ALLOYS • STEEL ADDITIVES
COMMERCIAL MINERALS AND OXIDES • ZIRCONIUM & TITANTIUM • (IODIDE PROCESS)
LITHIUM METAL, CHEMICALS, AND MINERALS • STRONTIUM CHEMICALS

Why Risk Accidents with Your Industrial Trucks?

Plant accidents can cost you plenty. But *electric* industrial trucks can help eliminate the risk of three kinds of serious accidents—and save you money at the same time.

Fume free. Especially indoors, you must guard against air pollution. Fumes make personnel uncomfortable. And they can be fatal, even in low concentrations. But with electric industrial trucks you are free of this hazard. They're safe even in small rooms, in unventilated rooms, and in rooms with large numbers of people.

No fuel storage problem. You buy your electric power as you use it—from your local electric company—and at low rates that have been declining for years. Heavy duty storage batteries furnish dependable power throughout their long life. And you are relieved of the need to store liquid or gas fuel. Providing safe areas, handling the fuel daily to fill truck tanks—these difficulties are eliminated. And there's little danger of the truck itself catching on fire.

Cleaner floors. Your personnel are far safer against the danger of slipping on oil or grease spots. Electric industrial trucks have no messy crankcases—the battery power plant has no moving parts to lubricate. They run clean, keep your plant clean.

Why take chances? Besides increasing your plant safety, electric industrial trucks last longer, cost less to operate and less to maintain—savings that add up to an average of $1000 per year per truck.

These are important considerations for up-to-date management men today. Have a talk with your nearby industrial truck dealer or salesman. He's listed in your classified telephone directory under "Trucks—industrial."

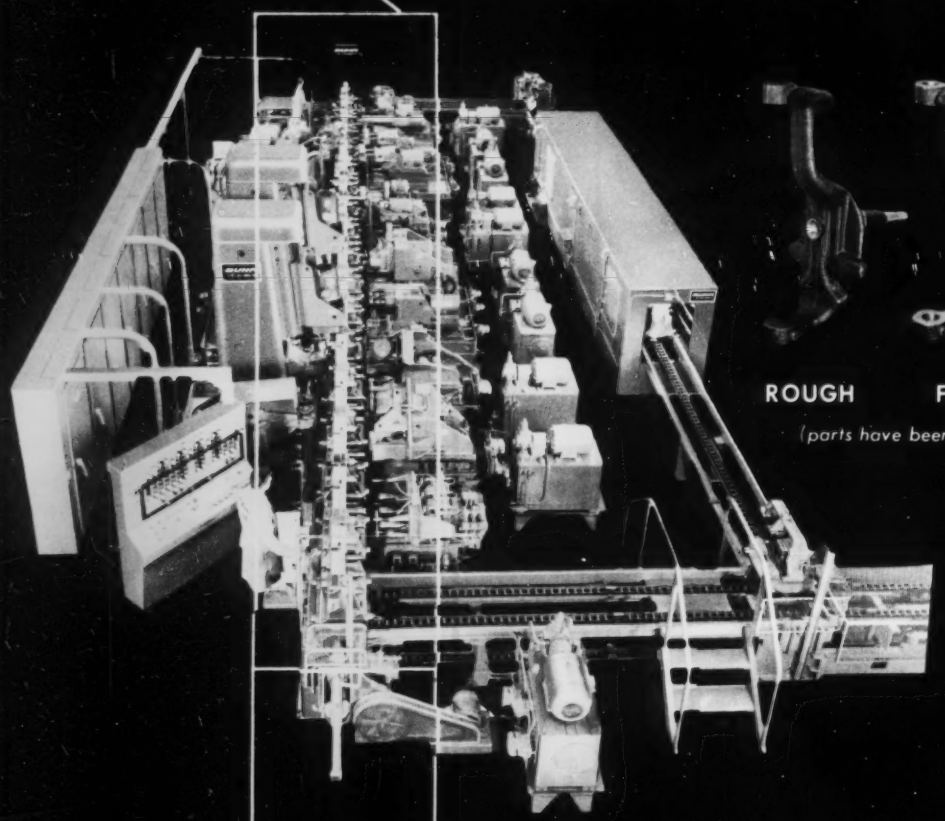
This message is presented as a service to industry by Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

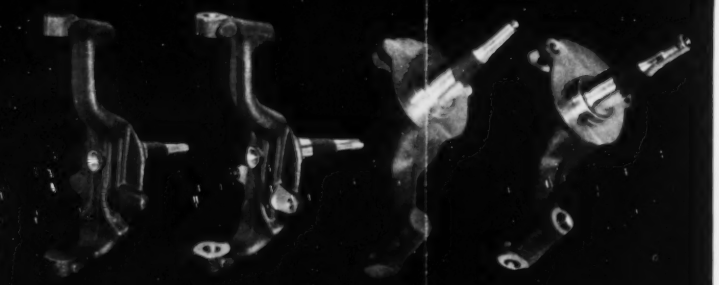
THE ELECTRIC STORAGE BATTERY COMPANY **Exide®**

BUHR
ECONOMATIC

sets
precedent
with the beef
to process
difficult parts
like this...

BUHR ECONOMATIC sets prece



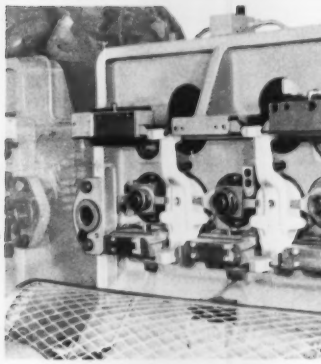


ROUGH FINISH ROUGH FINISH

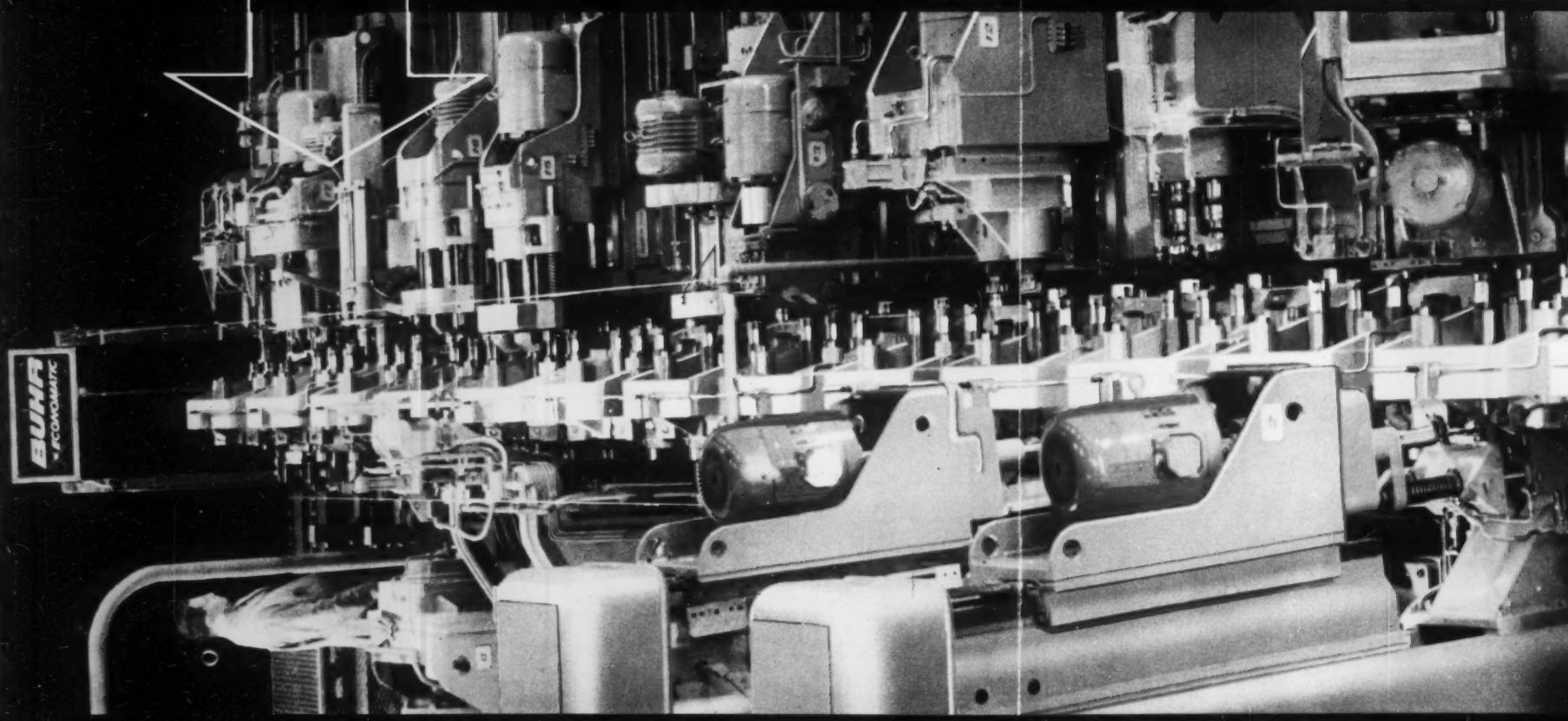
(parts have been ground and qualifying pads broached)

operations

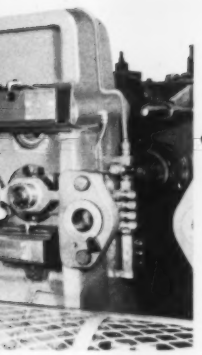
(4) milling, (8) drilling,
(2) rough taper-reaming,
(2) finish taper-reaming,
(2) spot facing, (5) chamfering,
(1) tapping, (1) threading,
(1) steel-brushing and (3) probing



- automatic probe and b
- special Buhr sectional-
- standard and special p
- spindles arranged for
- hardened and ground
- central-mist lubricatio
- individual push-buttor

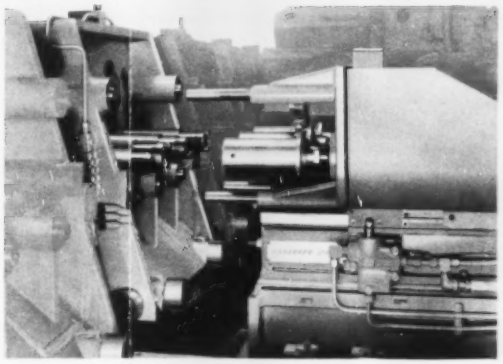


edent by performing 29 operations on two steering knuckles every 32½ seconds!

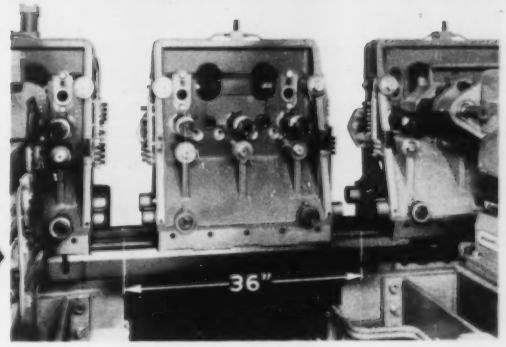


PARTS IN CLAMPED POSITION

INDIVIDUALLY-CONTROLLED TORQUE WRENCHES



ONE OF FOUR IDLE STATIONS



standard features

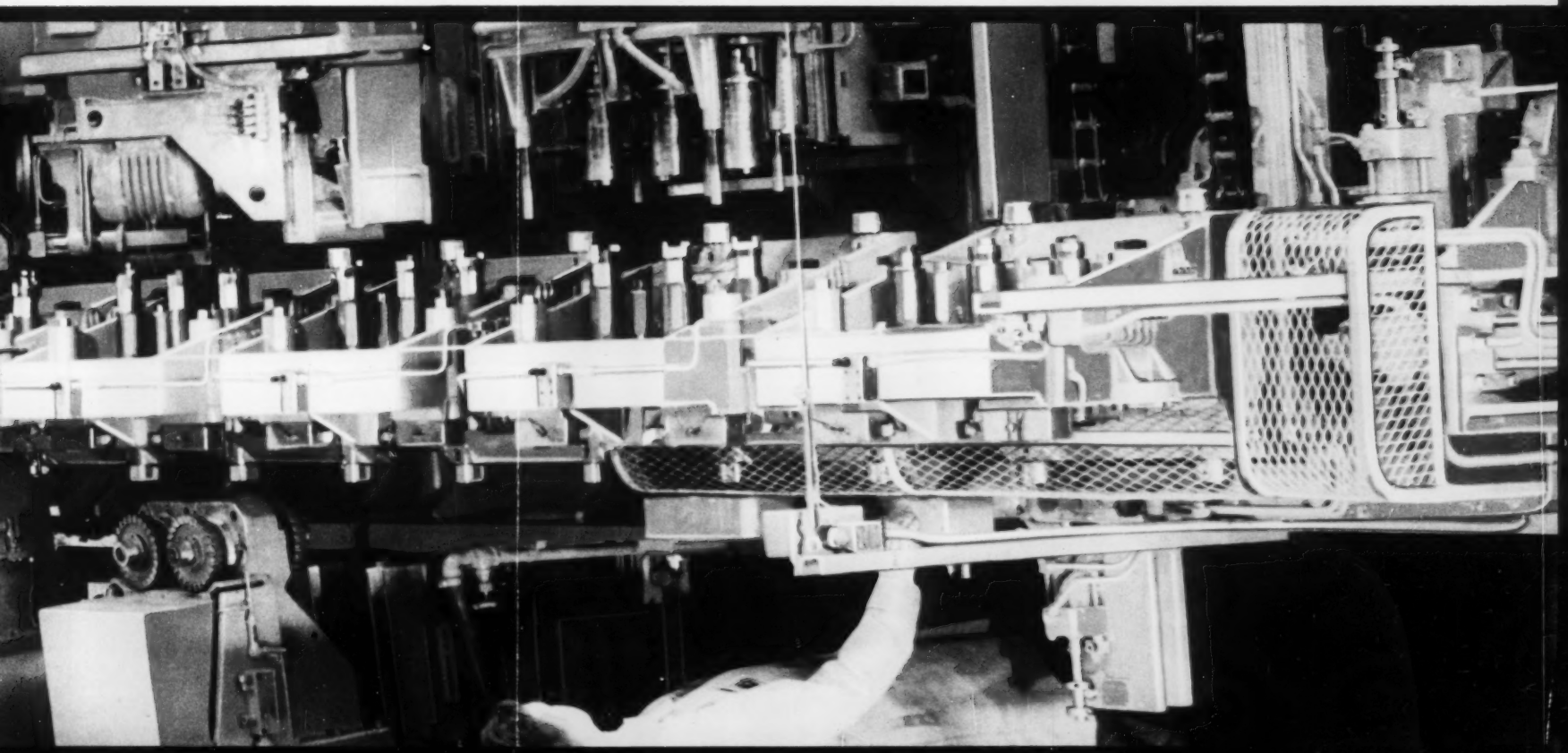
d blow-out before tapping
al-base construction to facilitate future part changes
l parts interchangeable for ease of maintenance
r pre-setting of cutting tools
d steel ways
ion on spindle heads
on stations on feed-units

- J.I.C. Standards throughout
- automatic lubrication of all moving parts
- lube-fault alarm system
- positive pallet-clamping

BUHR MACHINE TOOL CO.®

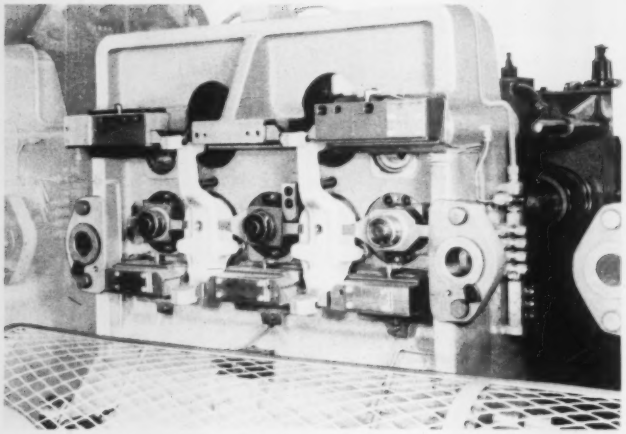
ANN ARBOR, MICHIGAN

Solidly Engineered · Precision Built · for World's Leading Manufacturers



automotive steering knuckle
(TWO VIEWS, SAME PART)

with fixtures like this...



built to hold the parts rigidly without distortion

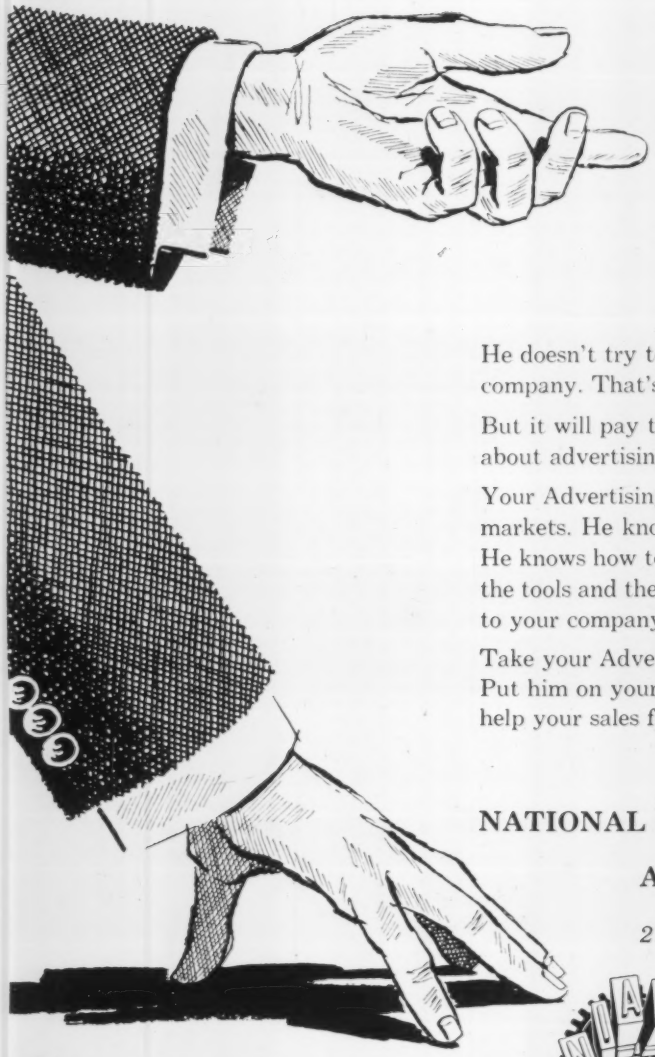
BUHR ECONOMATIC

setting the pace in the performance of complex operations in modern

ECONOMATION

"ECONOmical
auto**MATION"**

Does your Board of Directors listen to this man?



He doesn't try to tell your Directors how to run the company. That's their job, and he respects it.

But it will pay them to listen to him when he talks about advertising for your company. That's his job!

Your Advertising Manager is a man who knows markets. He knows the science of "mechanized selling." He knows how to help turn sales goals into sales. He has the tools and the know-how to make major contributions to your company's progress and profit.

Take your Advertising Manager into your confidence. Put him on your first team. Let him manage. He can help your sales force sell more economically.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

COST CUTTING IN ACTION

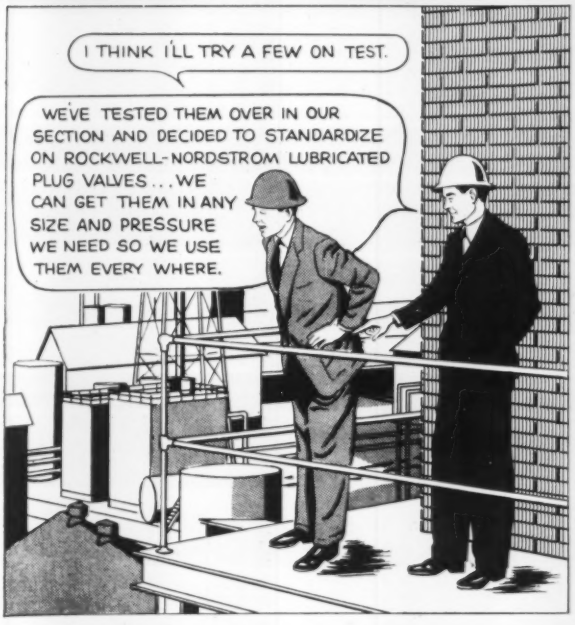
by Rockwell-Nordstrom

I'M ABOUT READY TO GIVE UP ... IF THE VALVES DON'T LEAK, THEY STICK. EVEN ON EASY SERVICES I HAVE TROUBLE. I'VE BEEN CALLED IN TWICE THIS MONTH ON VALVE MAINTENANCE AND DOWN TIME COSTS.
WHY DON'T YOU GIVE THOSE LUBRICATED PLUG VALVES A TRY?

I THOUGHT THEY WERE OIL INDUSTRY SPECIALTY VALVES.
SURE, THEY'RE AN OLD STAND-BY FOR THE OIL AND GAS MEN, BUT WE'VE HAD LOTS OF SUCCESS WITH THEM HERE AND IN SOME OF OUR OTHER PLANTS.

WELL, THEY'RE NEW TO ME. WHAT'S SO GOOD ABOUT THEM?
LOOK HERE: THEY CAN'T LEAK BECAUSE THEY'RE SEALED BY PRESSURIZED PLASTIC LUBRICANT IN THESE GROOVES, THE TAPERED PLUG SEATS PERFECTLY AND LUBRICANT PREVENTS STICKING.

WHAT ABOUT COSTS?
THEY COST LESS TO USE BECAUSE THE LUBRICANT STOPS METAL-TO-METAL WEAR AND THE SEATS ARE NEVER EXPOSED TO THE LINE. AND, THEY DON'T COST ANY MORE TO BUY THAN ORDINARY VALVES.


I THINK I'LL TRY A FEW ON TEST.
WE'VE TESTED THEM OVER IN OUR SECTION AND DECIDED TO STANDARDIZE ON ROCKWELL-NORDSTROM LUBRICATED PLUG VALVES ... WE CAN GET THEM IN ANY SIZE AND PRESSURE WE NEED SO WE USE THEM EVERY WHERE.

ROCKWELL-
Nordstrom
VALVES

LUBRICANT SEALED FOR POSITIVE SHUT-OFF

Rockwell-Nordstrom valves are available in a complete range of sizes and ratings in semi-steel, steel, stainless steel and other corrosion resisting metals.

Send Coupon For Free Literature

Rockwell Manufacturing Company
Rockwell-Nordstrom Valve Division
Department S-710, Pittsburgh 8, Pa.

☐ Please send me complete information on Rockwell-Nordstrom valves for process, industrial and manufacturing flow control.

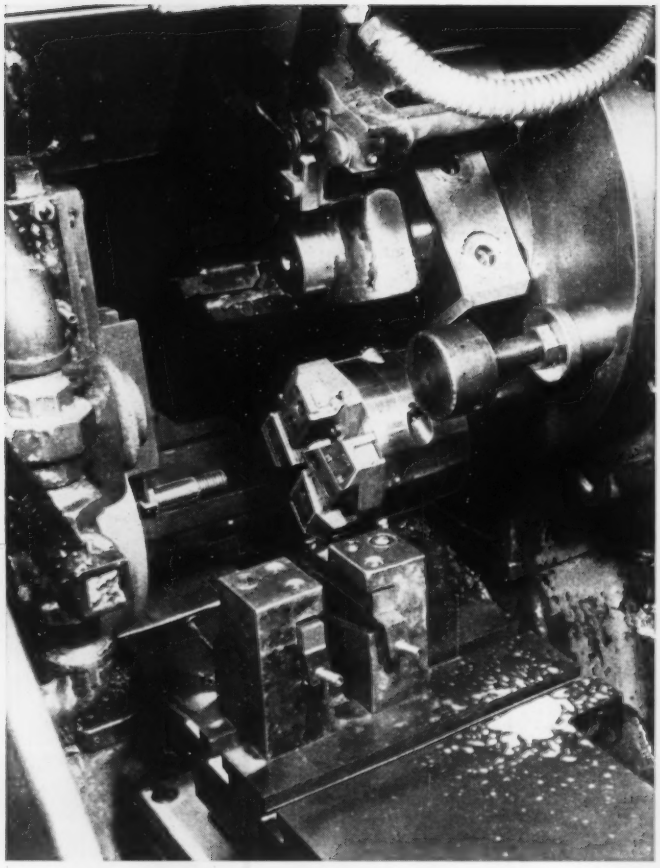
☐ Please send me the name of your nearest distributor . . . ask him (to) (not to) call immediately.

Name_____ Title_____

Firm_____

Street_____

City_____ Zone_____ State_____



AUTOMATIC THREADING

to **CLOSE** *tolerances on single-spindle automatic*

Automatic opening and closing and ability to meet exacting concentricity requirements were the principal reasons a LANDIS Die Head was selected to thread drive wheel cap screws for industrial lift trucks manufactured at the Yale Materials Handling Division of The Yale and Towne Mfg. Co. in Philadelphia, Pa.

5/8", 11-pitch UNC threads are cut 7/8" long on 3140 steel at 18SFM by a LANDMATIC Head on a Cleveland Single-Spindle Screw Machine. Threads meet Class 3 tolerances and are concentric with the screw body within .002"—with 400 pieces completed between chaser grinds.

A standard 1¼" FD LANDMATIC Head (normally used on turret lathes) is being used for this work—a stationary, self-opening head arranged for automatic closing. A special over-travel feature eliminates the necessity of a complicated, accurately-set closing cam on the machine.

Wide range and oversize capacity are important features of this head—¼" to 1¼" normal range, short thread lengths up to 2¾" in diameter with oversize chaser holders. Ask for Bulletins F-80 and F-90.

479

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA

Another **STANLEY STEEL STRAPPLICATION*** on the job

Making 3 times 16 equal ONE

3 tiers of cylinder head forgings, 16 forgings to a tier, make a sum total of 48. But secured to a pallet by the Stanley "Uni-Tie" Method, all 48 become ONE compact package, easier for this Cleveland manufacturer to handle, store and ship. Using the Stanley Electric Skid Magazine Power Tool, every strap is effortlessly and speedily pulled up to the same pre-determined tension, so there's no danger of the strapping loosening or the load shifting.

Perhaps teaming up the Stanley "Uni-Tie" Method with the Stanley ESM Tool is the way for **you** to save time, space, man-power or eliminate costly containers. But whatever your packaging or shipping problem, Stanley has ways to solve it. **WRITE FOR YOUR FREE COPY** of the "Stanley Strapplication Manual of Packaging and Shipping" to **STANLEY STEEL STRAPPING,** Division of The Stanley Works, Dept. J, 1476 Lake Street, New Britain, Conn.

INSURE IT-SECURE IT-WITH STANLEY STEEL STRAPPING

STANLEY

**The system-atic way to solve specific packaging and shipping problems*

STANLEY TOOLS • STANLEY HARDWARE • STANLEY ELECTRIC TOOLS • STANLEY STEEL STRAPPING • STANLEY STEEL

for faster aluminum service?

No need to keep prospecting for a better aluminum source – once you're acquainted with fast, reliable Frasse warehouse service. Frasse knows the metal-working industry's needs – is geared in facilities and know-how to provide them. Each order, large and small, is processed with time-table precision by Frasse trained personnel . . . and rushed to your plant – fast.

Quality, too – is something you can depend on from Frasse. Time-tested Reynolds Aluminum–processed to exacting tolerances with completely uniform characteristics – can help your production picture and the salability of your product.

Frasse aluminum stocks include a complete range of sizes in *all* of the popular shapes, grades and tempers–and Frasse engineers will be glad to assist with grade selection and methods of fabrication. Call your nearest Frasse office when you next need aluminum. You'll like the smooth efficiency and speedy delivery that helps you get the job done . . . faster.

Call FRASSE 1st for ALUMINUM

Screw Machine Stock • Rounds • Squares • Hexagons • Rectangles • Angles • Channels • Sheets • Plates • Tubing • Pipe • Fittings • Extrusions

*Tool and Jig Plate: This newcomer to Frasse stocks could be the time and cost saving answer to your tooling problems. Have you tried it?

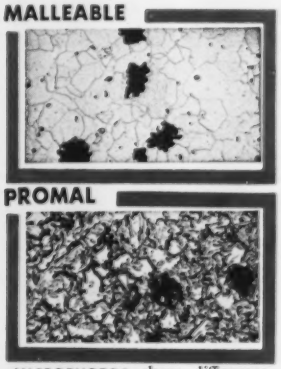
Peter A. Frasse & Co., Inc.

Distributor of Reynolds Aluminum

New York 13, N. Y.	Philadelphia 29, Pa.	Buffalo 7, N. Y.	Syracuse 1, N. Y.	Hartford 1, Conn.
17 Grand St.	3911 Wissahickon Ave.	P.O. Box K, Sta. B	P.O. Box 1267	P.O. Box 1949
WAlker 5-2200	BAldwin 9-9900	BEdford 4700	SYracuse 73-5241	JAckson 9-6861

LYNDHURST • ROCHESTER • BALTIMORE

Specify longer-lasting Link-Belt Promal chains for extra durability



MICROPHOTOS show difference between ordinary malleable iron and Promal. Upper—white areas in malleable microphoto represent "free-iron" . . . black shows soft nodules of carbon. Lower—the dark areas in the Promal structure show stronger, stiffer reinforcing material which strengthens metal and resists distortion and wear.

◀ **UP TO 475 TONS** per week of steel mill scale are recovered by this Link-Belt system. Promal chain on Straightline Collector moves scale from settling tanks to discharge conveyor. Promal is especially suitable for long heavy-duty conveyors and elevators.

Specially heat-treated malleable iron provides extra wear resistance

Fewer conveyor shutdowns and minimized replacements are economies realized by users of Link-Belt Promal chain. Its greater strength absorbs continuous impact loads — and wear resistance supplies the durability to cope with severe abrasion.

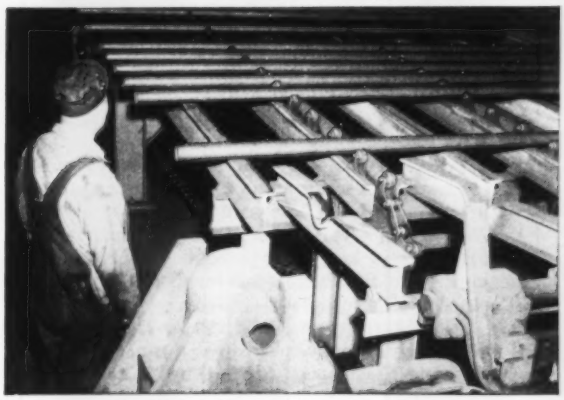
Promal is more than a partially annealed or surface-hardened malleable iron. Developed by Link-Belt, this specially heat-treated malleable iron is actually transformed into a metal of radically different physical properties. Promal, because of uniform micro-structure throughout its whole section, provides greater ultimate strength, higher yield point, exceptional fatigue resistance and a remarkable capacity to withstand abrasion.

For unusually abrasive or mild corrosive conditions, Promal chain can be furnished with "file-hard" surfaces. Copper bearing or special alloy content also available.

Where and how to apply Promal in the metal working industry

Choose Link-Belt Promal chains for highly abrasive conditions—for extra strength and wear resistance demanded by heavy loads or long, sliding conveyors. They last much longer . . . cost but a little more.

The wide range of Link-Belt chains available in Promal includes all types of cast and combination chains.



Promal chain controls uniform cooling of pipe

An inclined conveyor, using Link-Belt Class 1100 Promal chain with attachments, permits an Ohio steel mill to control cooling of longer tubes than previously possible. Pipe is received from hot finishing operations at temperatures up to 1800 F. Controlled chain speed permits uniform cooling of outer tube periphery.

HEAT-RESISTANT PROMAL is recommended for temperatures up to 1000 F. This SMGL-618 Promal chain conveyor with riser attachments picks up and conveys sheet steel through furnace. Chain has operated continuously for two years without failure.

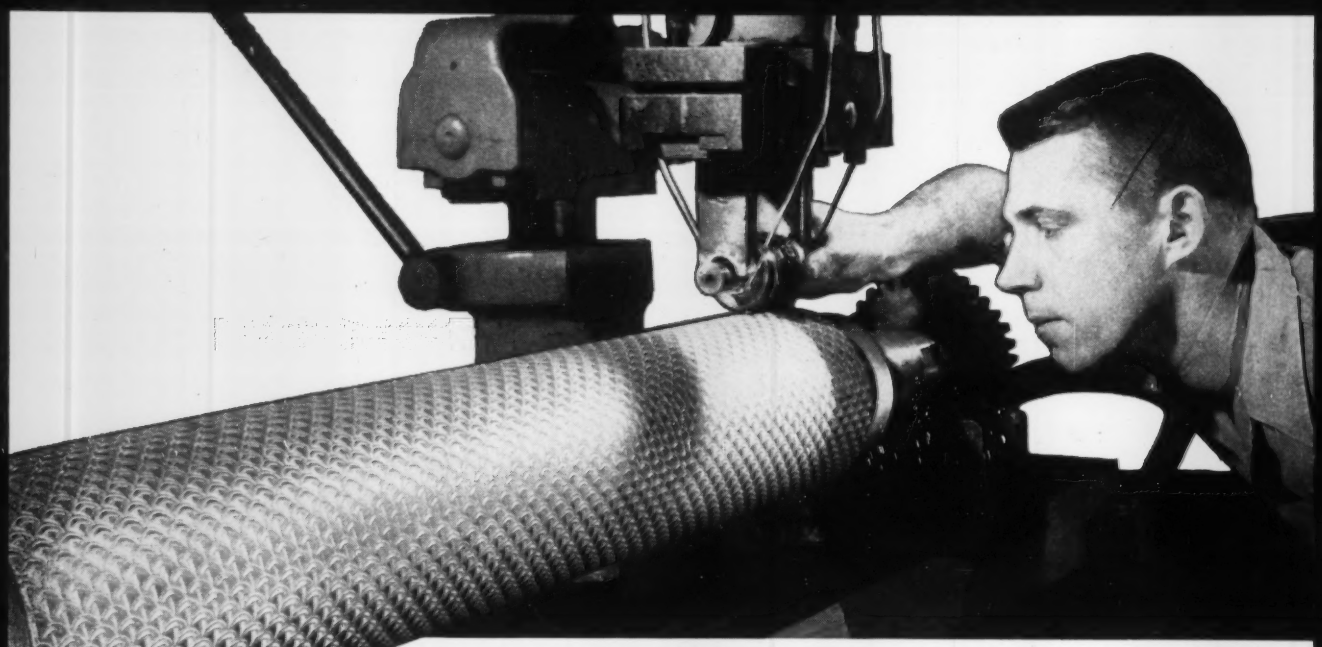
HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT

THE SYMBOL OF QUALITY — LB — LINK-BELT

CHAINS AND SPROCKETS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Sales Offices, Stock Carrying Factory Branch Stores and Distributors in All Principal Cities. Export Office, New York 7; Canada, Scarboro (Toronto 13); Australia, Marrickville, N.S.W.; South Africa, Springs. Representatives Throughout the World. 14,281



A Pamarco worker sets the mill, or male die, for final pass on a roll he is engraving with a fan pattern. The roll will be used to impart the pattern to plastics and imitation leather materials. At left, skilled engraver Claude Gallois uses a graver's tool to cut a design into female die. His work will be transferred to male die for use in engraving rolls like that shown above.

Steel Tubing With Glamour

Pittsburgh Tubes Meet Exacting Pamarco Tests

Steel tubing is glamourized at Paper Machinery & Research, Inc., with engravings so intricate they are checked on a 600-power microscope.

Cold-drawn seamless mechanical tubing from Pittsburgh Steel Company is given a beauty treatment at Pamarco's Roselle, N. J., plant to achieve patterns like those pictured here.

Pamarco and its supplier, A. B. Murray Company of Elizabeth, N. J., rely on Pittsburgh Tubes to meet exacting requirements.

Pamarco makes and engraves all kinds of industrial rolls for flexographic and gravure printing, paper converting, plastics manufacturing and textile plants.

Many manufacturers of printing presses, paper converting machinery and plastics processing equipment install Pamarco rolls as original equipment. In addition, the company re-engraves rolls, rebuilds them and provides fast engineering help on industrial roll applications.

Making micro-precision rolls for such varied uses as laminating, printing, coating, embossing, ink transferring and a multitude of other duties calls for precise engineering, rigid quality control, accurate machining and finish grinding.

In every operation, quality of the steel is basic.

From the large stocks in the A. B. Murray warehouses come Pittsburgh Steel tubes of the high, uniform quality which Pamarco must have to produce the best possible industrial rolls at economical prices.

The close relationship between Pamarco and A. B. Murray is based on not only steel but also on fast, dependable service.

The service given by A. B. Murray is backed up by the dependable tubes furnished by Pittsburgh Steel which meet these requirements, as outlined by Pamarco General Manager David Killary:

• **No inclusions or seams** are permitted since a defect can mean scrapping a cylinder during machining or engraving. Mr. Killary said:

"We've had a very favorable relationship with A. B. Murray. We've had fewer inclusions, for example. Consequently, A. B. Murray has become a prime supplier. Their service is tops."

• **Grain structure** of the steel is closely checked at Pamarco. Uniformity in grain is a must since rolls are ground and re-engraved many times through the years. Hard spots or other sub-surface defects mean the possibility of ruin to expensive engravers' tools.

Machinability is vital. Tubes that are out of balance are difficult to grind concentrically. While Pamarco dynamically balances every cylinder to insure trouble-free performance, the company says "we find Pittsburgh tubes require a minimum of balance correction."

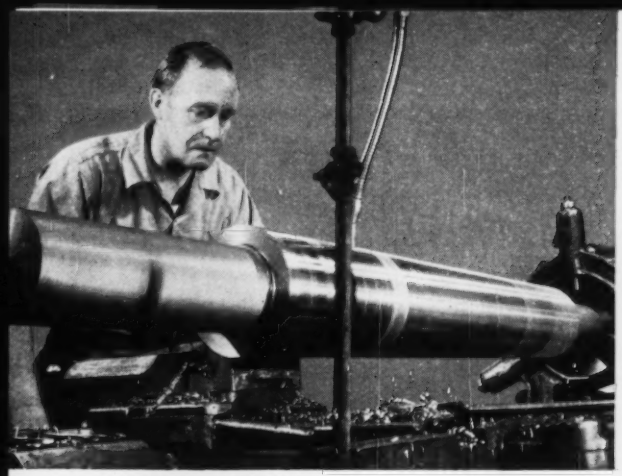
• **Size tolerances** on tubes are another important factor. Oversized tubes require extra machining, which runs up costs. Undersize tubes may make it impossible to complete machining operations and hold to size.

If tubes are not straight, or have high or low spots, or if they belly in the middle, then it is necessary to buy tubing well oversize in order to clean up the surface to the required diameter.

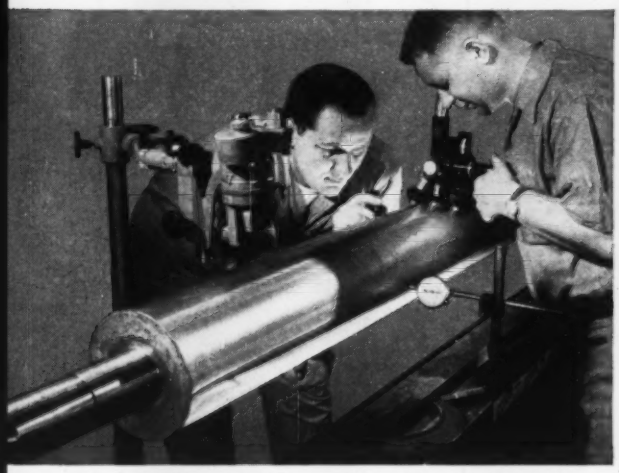
Quality of the steel is demonstrated by the quality control checks made on tubes as they progress through the shop and in final inspection.

Pamarco uses a battery of high-powered optical mi-

(Advertisement)



Uniform concentricity and wall tolerances of Pittsburgh tubing pay off in machining 7¼-inch OD tube to 6.983 as it assumes proportions of printing roll.



Final check on ink transfer roll made from quality Pittsburgh seamless involves close inspection of design. Inspector at left checks overall design while partner uses gravurescope to check width and depth.

croscopes to check the engravings on steel cylinders. The depth of the engravings is checked, for example, on a 600-power gravure microscope. Concentricity and balance also come in for close examination to make sure they meet rigid standards.

Where quality of the steel is important and where good, dependable warehouse service is essential to manufacturing, the best team is the tube mills of Pittsburgh Steel and a responsible, quick-to-move warehouse.

If you have tubing problems that need good steel and good warehouse service, pick out the closest distributor to you from the list at the right and act now. Put in a telephone call and you've got real help on its way to you—fast!

Close contact between A. B. Murray salesman Jack Fischer (right) and veteran warehouse manager Frank Grippo, insures steady flow of Pittsburgh tubes to Pamarco's plant from racks at Murray's Elizabeth, N. J., warehouse.

Pittsburgh Seamless Distributors

Baker Steel & Tube Company
Los Angeles, California

Chicago Tube & Iron Company
Chicago, Illinois

Cleveland Tool & Supply Co.
Cleveland, Ohio

Drummond McCall & Co., Ltd.
Montreal, Quebec, Canada

Edgcomb Steel Company
Philadelphia, Pennsylvania

Gilmore Steel & Supply Co.
San Francisco, California

Earle M. Jorgensen Co.

Perry Kilsby, Inc.
Los Angeles, California

Mapes & Sprowl Steel Co.
Union, New Jersey

Metal Goods Corporation
St. Louis, Missouri

Miller Steel Company, Inc.
Hillside, New Jersey

A. B. Murray Co., Inc.
Elizabeth, New Jersey

C. A. Russell, Inc.
Houston, Texas

Ryerson, Joseph T. & Son, Inc.
Chicago, Illinois

Solar Steel Corporation
Cleveland, Ohio

Steel Sales Corporation
Chicago, Illinois

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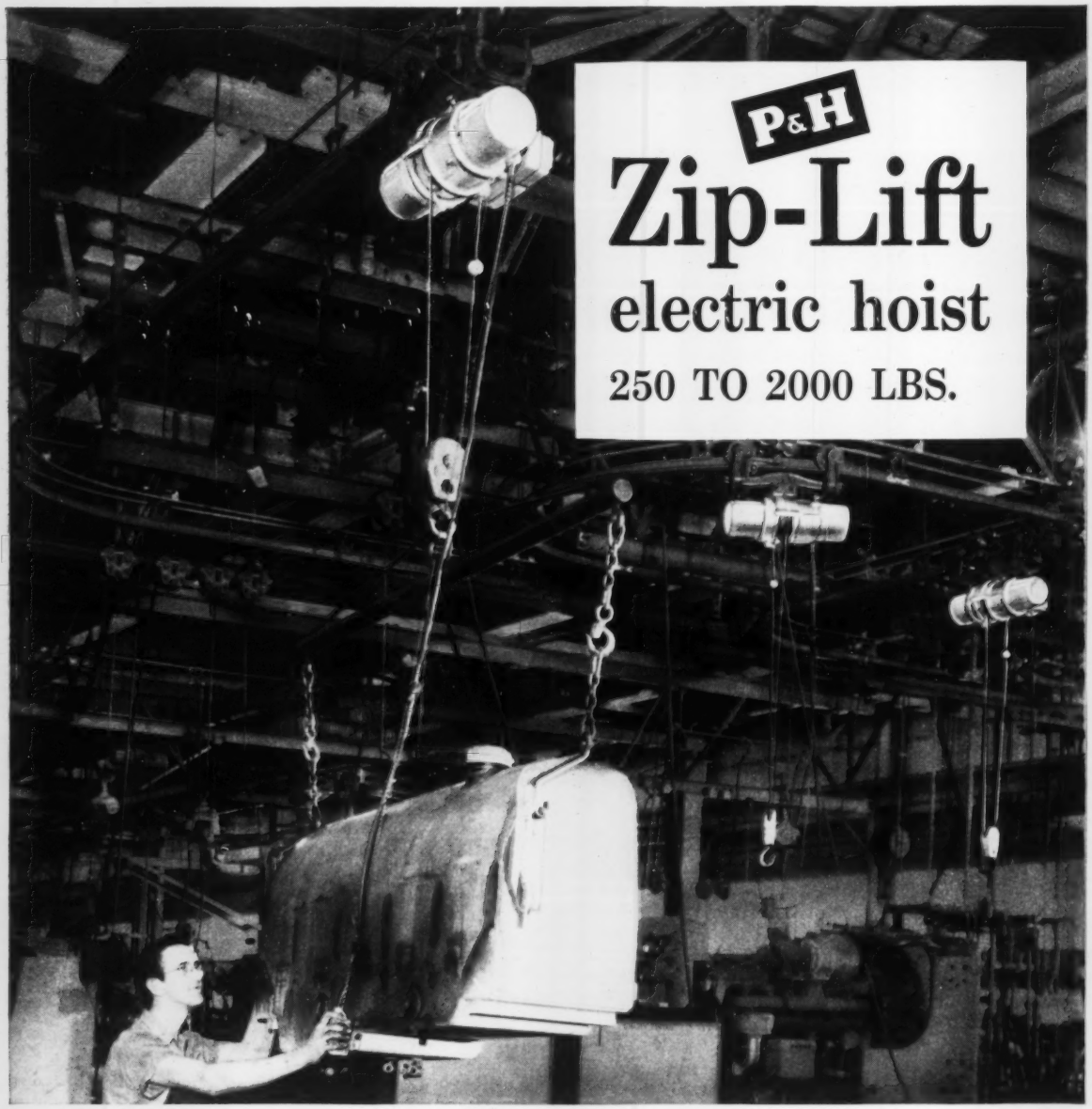

Heavy on safety... light on price!

Here's a wire-rope hoist that can put ZIP into your material handling—eliminate production delays and back-breaking manual lifting — and still be kind to your pocketbook.

And P&H Zip-Lift® is *extra-safe!* It has two brakes — and either of them will hold capacity loads *even if power fails.* Upper and lower limit switches protect both load and hoist . . . the shrouded load block guards worker's hands . . . low 24 volts at push-button station assures operator safety.

These safety features are standard on Zip-Lift — all included in the basic low, low price. They are illustrated in our Bulletin H-20, along with new design features that make Zip-Lift your best hoist buy. We'll gladly send you a copy. Write Dept. 211E, Harnischfeger Corp., Milwaukee 46, Wis.

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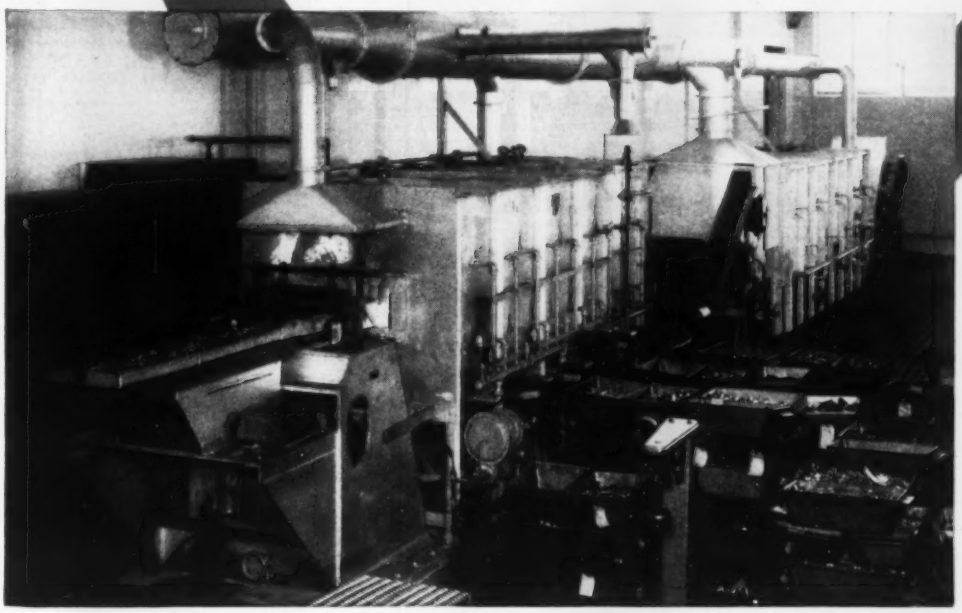
P&H ...quality and service for 73 years

TO PRODUCE QUALITY SOCKET SCREWS THE H-K WAY—

A NITROGEN GENERATOR FORMS A NEUTRAL ATMOSPHERE IN THIS CONTINUOUS HARDENING FURNACE

With this modern equipment, every H-K socket screw is uniformly heat-treated and tempered to provide exact tensile and torque specifications at all times. By carefully controlling the furnace atmosphere, we produce the distinctive, black H-K finish.



For the finest in socket screw products . . . for unmatched SAME-DAY SERVICE—the name to remember is Holo-Krome. Write for free catalog and technical information.

SOLD ONLY THROUGH AUTHORIZED HOLO-KROME DISTRIBUTORS

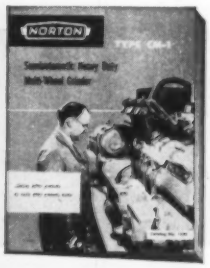
HOLO-KROME SOCKET SCREWS

THE HOLO-KROME SCREW CORPORATION • HARTFORD 10, CONN.

CYLINDRICAL GRINDERS

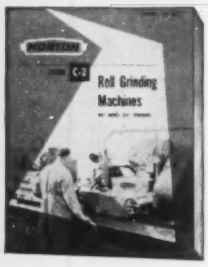
10" Type CTU and 14" Type LCTU. Semiautomatic or plain. For plunge or traverse operations, from roughing cuts to finest finishing. Can take a wide range of multi-wheel mounts. In production line and job shop work these machines have doubled production, replaced several machines, eliminated extra operations. *Catalog No. 1787*

10" Type CV-4 and 14" Type LCV-4 Angular Wheel Slide. Semiautomatic machines that grind thrust surfaces and adjacent diameters in one fast, automatic plunge operation. They leave a concentric grain pattern in the thrust surface finish, assuring a better seal surface and appearance. *Catalog No. 1658*



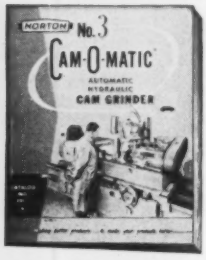
Type CM-1 Heavy Duty Multi-Wheel. Semiautomatic. Makes four or more cuts simultaneously, in a single plunge-grind cycle. Brings new speed, accuracy and economy to the grinding of multi-diameter parts. Many automatic features, including one-lever control. *Catalog No. 1550*

ROLL GRINDERS



Type C-2. A heavy duty machine, featuring faster cutting, quicker set-ups, easier operation. Available as a plain, semiautomatic or roll grinder. One-lever control of grinding cycle on the semiautomatic. As a roll grinder it includes the famous Norton tilting wheel head. *Catalog No. 1827*

CAM GRINDERS



NO. 3 CAM-O-MATIC Cam Grinder.* An automatic, hydraulic machine that is setting new standards for production, precision and finish. Grinds all cams and the camshaft eccentric successively and automatically, in one handling. Entire operation geared to split-second efficiency. *Catalog No. 191*

Check these guide books to

bigger grinding profits

Get the facts on how Norton grinding machines can benefit your production

In building the world's largest line of grinders and lappers — including automatic machines and machines for specialized operations — Norton offers you the greatest opportunities to modernize.

A representative selection of Norton machines is listed here, together with their catalogs. It will pay you to send for any catalog that concerns your grinding or lapping operations. Learn how replacing your obsolete equipment with new Norton machines will enable you to meet competition with the best production tools in the field. Learn also, how the Norton Lease and Financing Plans enable you to modernize, yet conserve your capital.

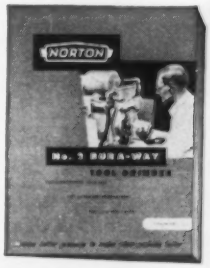
Ask your Norton representative for the literature you want, or write direct. And remember: only Norton brings you such long experience in both grinding machines and grinding wheels — to bring you the "Touch of Gold" that helps you produce more at lower cost. NORTON COMPANY, Machine Division, Worcester 6, Mass.

CRANKPIN GRINDERS

Automatic Transfer Type. For completely automatic crankpin grinding — a news-making Norton *"first."* Locates, grinds, gages, transfers — all automatically — cutting costs on each crankshaft ground. Typical of Norton's rapid progress in automatic operation. *Catalog No. 1837*

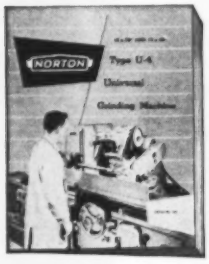
CUTTER AND TOOL GRINDERS

No. 20 Cutter And Tool Grinder. Fastest, most versatile machine in its class. Wheel head tilts 15° above or below horizontal and swivels through 360°, simplifying many difficult grinding jobs. Easy to set up, operate and maintain. *Catalog No. 189*



No. 2 BURA-WAY Tool Grinder.* Unequalled for grinding convex single point and form tools. Generates, produces and maintains relief angles constant in the direction of the feed. Duplicates the master tool form exactly. Extends the life of carbide-tipped and other tools. *Catalog No. 220*

UNIVERSAL GRINDERS



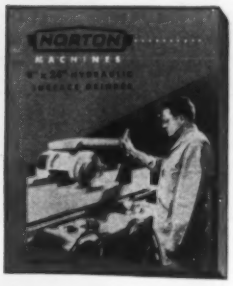
Type U-4, 12" x 36" and 12" x 48". Quick, easy set-ups plus fast grinding action save time and costs on a wide variety of external, internal, face and angular wheel-slide jobs. Simply turning a dial gives an infinite number of works speeds over its 40 to 400 rpm range. *Catalog No. 231*

LAPPERS

HYPROLAP Lapping Machine No. 48F.* An extremely fast, high production machine for single or parallel face flat lapping. Bonded abrasive laps produce work pieces free of grit. Three arrangements: plain, timed cycle; automatic continuous feed; semiautomatic continuous feed. *Catalog 1954*

Vertical Lapping Machine No. 16FC. Outstanding productive capacity for flat work up to 3" x 5" and cylindrical work up to 3" diameter. Can produce optically flat surfaces and diameter tolerances in millionths, with fine repetitive accuracy. *Catalog No. 212.*

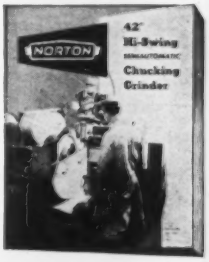
SURFACE GRINDERS



8" x 24" Hydraulic. Grinds plane surfaces speedily and economically, in large stock removal or close tolerance operations. Designed with both hand and hydraulic table cross feed. Convenient controls and easy accessibility reduce operating and maintenance time. *Catalog No. 190*

SPECIAL GRINDERS

42" Hi-Swing Semi-Automatic Chucking Grinder. For rapid, accurate grinding of large diameter, short parts, such as jet engine compressor wheels and similar components. Takes work held by chucks, face plates or special fixtures and permits grinding several surfaces without disturbing the set-up. *Catalog No. 1780.*



*Trade-Marks Reg. U. S. Pat. Off. and Foreign Countries

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NORTON

GRINDERS and LAPPERS

Making better products...to make your products better

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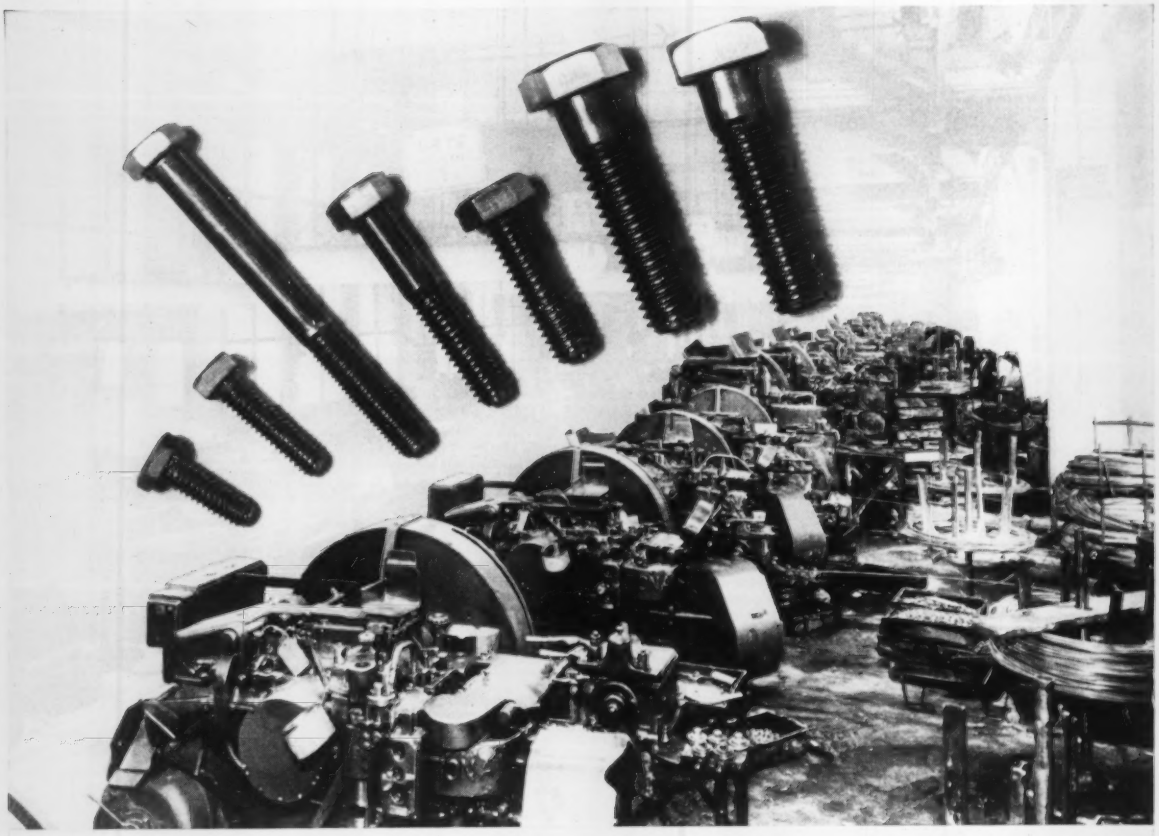
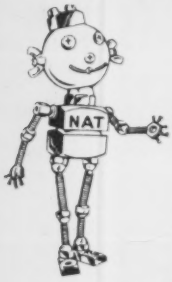




AUTOMATIC BOLT MAKING AT NATIONAL SCREW AND MANUFACTURING CO.

The National Screw and Manufacturing Company, Cleveland, Ohio, one of America's oldest manufacturers of fasteners, relies on NATIONAL Boltmakers for fast, efficient bolt production.

The above photograph shows one battery of fifteen NATIONAL Boltmakers producing bolts ranging in size from 3/16" up to 1/2" in diameter at National Screw's Cleveland plant.

NATIONAL Boltmakers cut steel rod to proper length, extrude the blank, head, trim the head, point the end and roll the threads, *all automatically!* Grain flow in the head and threads is symmetrical and unbroken. The part is stronger because the cold-forging action increases fatigue resistance and tensile strength.

You are cordially invited to visit our plant to investigate how NATIONAL hot- and cold-process machinery can bring you fast, automatic production of your forged metal fasteners and components. No obligation.

NATIONAL
MACHINERY COMPANY
TIFFIN, OHIO—SINCE 1874

DESIGNERS AND BUILDERS OF MODERN FORGING MACHINES • MAXIPRESSES • REDUCEROLLS • COLD HEADERS • BOLTMAKERS • NUT FORMERS • TAPPERS • NAILMAKERS

Hartford Detroit Chicago

Greater Production Around the Bend

with SEALMASTER Equipped Pines Benders!

Write for Bulletin 454

Components are put through gruelling tests before they are finally accepted and "specified" by engineers of the Pines Engineering Co., Inc., for applications on their bending machines. Bearings are subjected to some of the most rigorous tests of all parts. Pines' engineers have selected SEALMASTER Bearing Units to do the job. Shown above is a Pines Model ¾ Bender widely used throughout industry, including the automotive, furniture, air conditioning and plumbing fields. Production rates as high as 900 bends per hour have been attained with this machine.

The Pines' case history is typical throughout industry where "Performance minded" manufacturers look to and depend upon the peak performer—SEALMASTER Ball Bearing Units.

SEALMASTER® BALL BEARING UNITS

Why are SEALMASTER *Ball Bearing Units So Much Better?*

. . . Write for information on this Exclusive Combination of Features:

ZONE HARDENING assures positive race to shaft holding power.

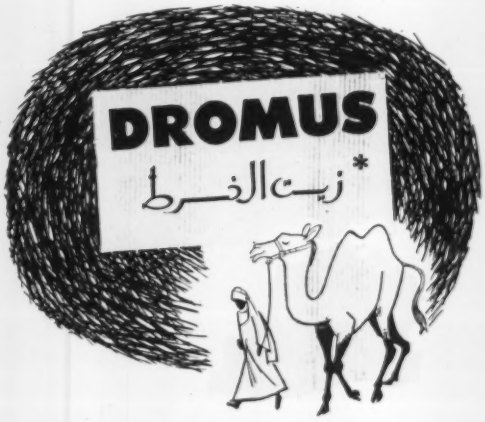
LABYRINTH SEAL keeps dust and dirt out, lubricant in.

LAND RIDDEN BALL RETAINER traps grease and prevents "churning."

LOCKING PIN AND PERIMETER DIMPLE assures positive lubrication.

SEALMASTER BEARINGS A DIVISION OF STEPHENS-ADAMSON MFG. CO. 99 RIDGEWAY AVENUE, AURORA, ILL.

No matter how you say it...



*TRANSLATION: CUTTING OIL

The performance and the brand are the same around the world

Other Outstanding Shell Industrial Lubricants

Shell Tellus Oil—for closed hydraulic systems

Shell Alvania Grease—multi-purpose industrial lubricant

Shell Turbo Oil—for utility, industrial & marine turbines

Shell Rimula Oil—for heavy-duty diesel engines

Shell Talona R Oil 40—anti-wear crankcase oil for diesel locomotives

Shell Dromus Oils, a quality line of soluble cutting oils, permit higher speeds and greater feeds while extending tool life. They have excellent wetting and cooling properties and are not sticky or greasy.

Dromus® Oils have the added advantage of being easy to mix in hot or cold, hard or soft water. They form emulsions which remain stable in practically any concentration required in the shop.

Today Dromus Oils are available to your customers abroad. You can be sure that they will enjoy the same efficient performance your domestic customers rely upon.

• • •

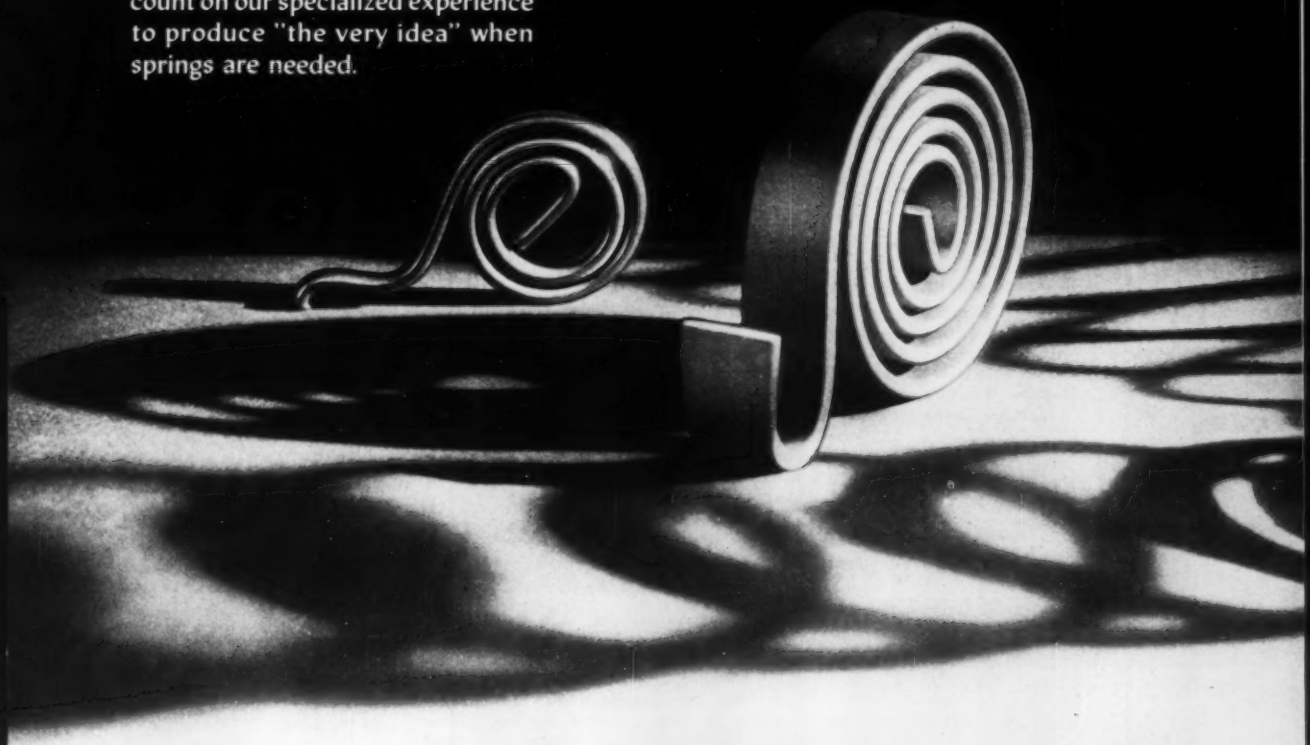
For more information, write Shell Oil Company, 50 West 50th Street, New York 20, N. Y., or 100 Bush Street, San Francisco 6, California.

SHELL DROMUS OILS

SHELL

IDEAS . . . into springs

During the thinking stage of new developments or improvements, count on our specialized experience to produce "the very idea" when springs are needed.



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World's Largest Manufacturers of Precision Mechanical Springs

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WALLACE BARNES STEEL DIVISION — Producer of High-Carbon Strip Steel

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from: *Metal & Thermit*
to: *The IDEA Minded*

Taking a big bite out of costs

Built by Bucyrus-Erie, this mammoth all welded shovel makes shorter work out of coal stripping operations. In one bite, it scoops an 80 ton load into its 14 x 12 x 9 foot bucket . . . bigger than an average room. The shovel stands 13 stories high, weighs more than 4,000,000 pounds . . . and is built for long, trouble-free service with strong welded connections.

Metal & Thermit's "Murex" electrodes were selected for many applications on this big welding job. These versatile, easily handled electrodes are used throughout industry wherever strong and reliable welds with good impact qualities are needed.

Jobs for plastisols become bigger . . . and still BIGGER

Interior of this large fume scrubber was *sprayed* with Unichrome Plastisol by Kaybar, Inc., Birmingham, Mich. The thick vinyl coating withstands abrasion, acids, alkalies, and many other corrosives. Being pore-free and seamless, the Unichrome Plastisol lining is now preferred for many jobs where rubber or plastic sheet linings were used formerly.

Note that sheer size is no longer a hindrance in applying plastisols. Firms like Kaybar with ever-expanding facilities are located at key points and can handle *your* big jobs, too.

Key performance in typing

Every buyer of an IBM Electric Typewriter knows how easily and economically it operates. Little do they know, however, of the many quality details that go into its construction for extra dependability.

Trip levers, for instance—vital links between key and letter—are chromium plated for increased resistance to wear and corrosion. Unichrome SRHS® Chromium is plated from a Unichrome Continuous Chromium Plating Barrel which assures complete coverage of parts, large output and economical operation.

PLATING MATERIALS
ORGANIC COATINGS
TIN & TIN CHEMICALS
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for every wheel that turns in industry

Lubricating oils, cutting oils, multi-purpose greases, greases for spraying . . . whatever your needs, Atlantic has the lubricant to help you. Atlantic lubricants insure maximum lubricating performance at low cost for every job in the plant . . . for every wheel that turns in industry.

For lubricating products that fit your specific needs, or for expert assistance with your lubricating problems, write or wire any of these Atlantic offices.

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of Brazil, Rua da Ajuda, Rio de J

ATLANTIC

LUBRICANTS · WAXES
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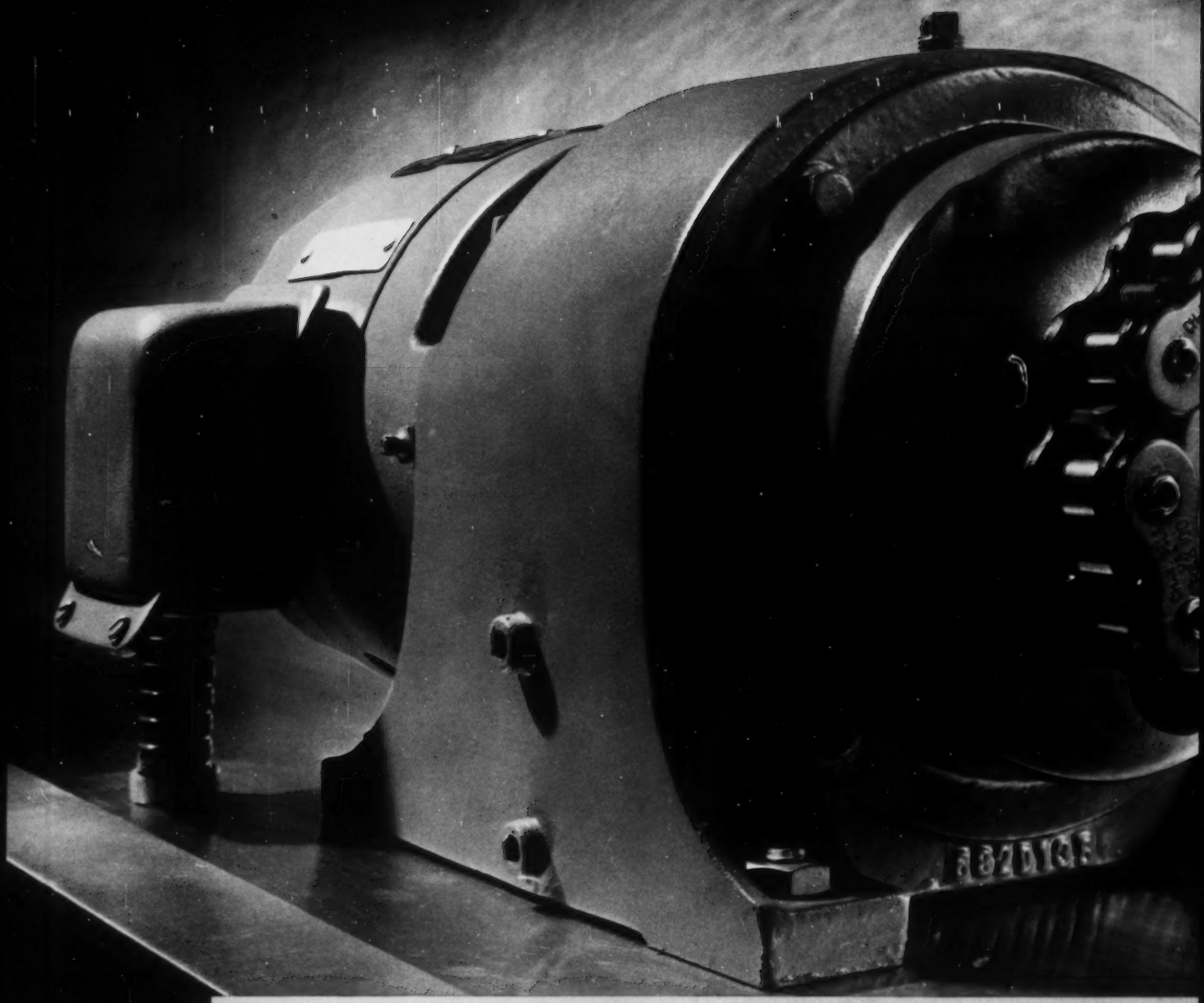
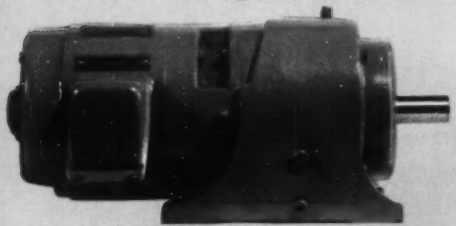
A great gear-motor

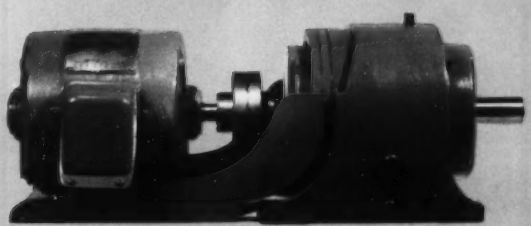


NEW integral unit

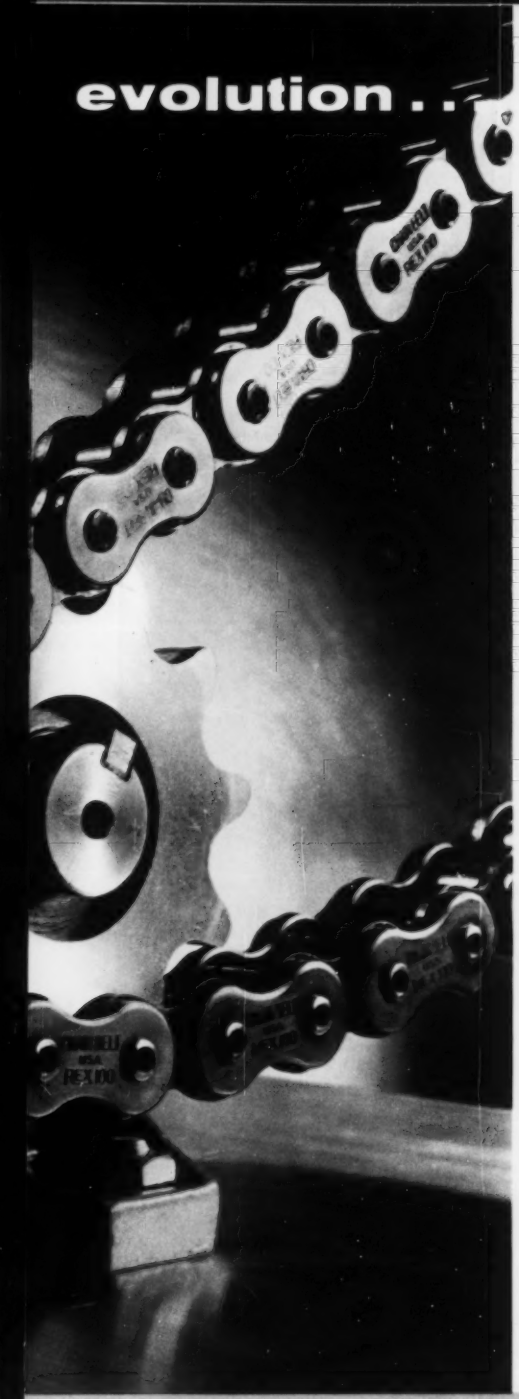


Compact, one-piece unit has complete, easily removable motor, machined-in alignment.

NEW all-motor unit



Providing wide application flexibility, motor change may be accomplished without disturbing gear.



General Electric's NEW gear-motor line

Now, you can meet all your low-speed drive requirements from a brand new line of General Electric packaged power transmissions. This 3-unit line is based on a new, completely simplified, helical design that has evolved from General Electric's 25 years of gear-motor engineering and application experience. And it's a line that can provide you with important, 3-way savings on all low-speed applications.

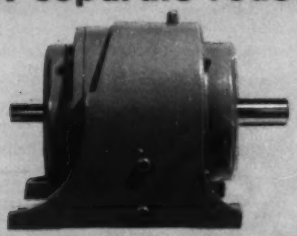
1. **Greater reliability:** This new line incorporates the most advanced gear manufacturing methods and all units are factory tested before shipment. In addition, you benefit because you purchase both motors and gears from a single manufacturer.

2. **Easier Maintenance:** A cinch to assemble and disassemble, alignment is machined right into each unit. Gear components may be carried in stock as sub-assemblies, minimizing downtime for normal repair.

3. **Reduced inventory:** You can reduce your inventory with no sacrifice to your operating continuity. Parts standardization and interchangeability permit a basically lower inventory investment.

This new line was developed to keep pace with the new requirements and wider applications of gear-motors brought about by advanced manufacturing techniques. *Get complete information from your nearest Apparatus Sales Office or Distributor—or write for bulletin GEA-6704, containing line highlights, to General Electric Co., section 851-6, Schenectady, N. Y.* Gear-Motor and Transmission Components Dept.

NEW separate reducer



Unit can provide a variety of output speeds with change of belt or chain rates.

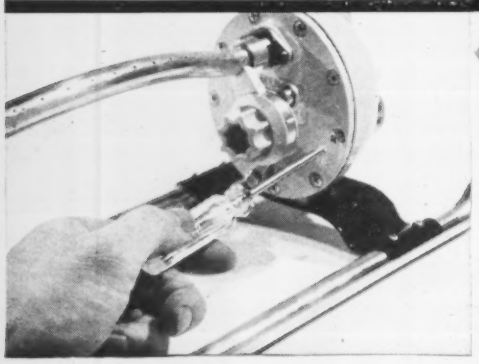
Progress Is Our Most Important Product

GENERAL ELECTRIC

Investigate the assembly savings made possible by P-K® self-tapping screws

Because P-K Type A Self-tapping Screws have clean, deep slots and sharp gimlet points . . . and because they are consistently uniform, Reznor Mfg. Co. enjoys important savings in the assembly of their gas heaters.

To hold the plastic handle halves of their Instant Heat Soldering Irons together, The Lenk Mfg. Co. specifies P-K Type F Self-tapping Screws. No need for a separate tapping operation. Production is increased and costs reduced—thanks to P-K Screws.

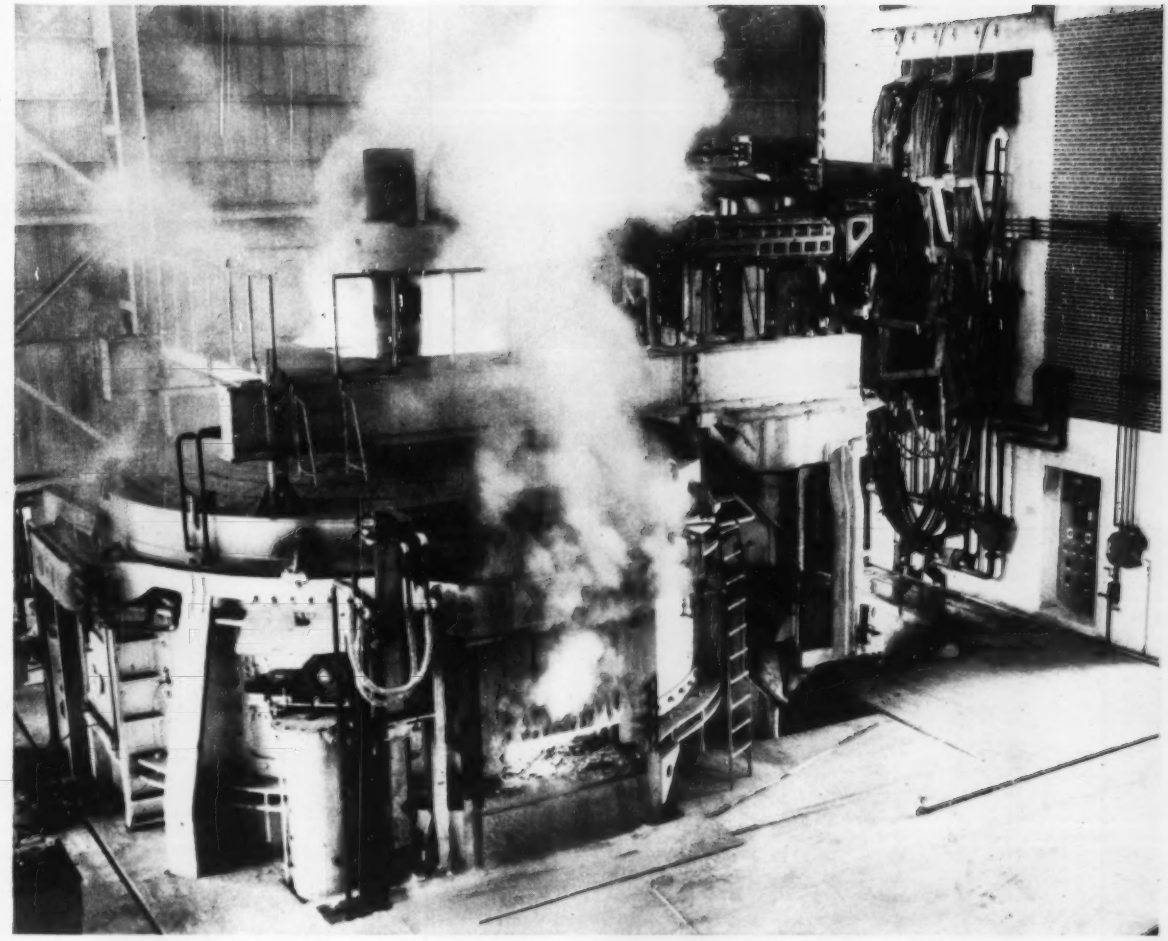


Melnor Industries, Inc. (formerly Melnor Metal Products Co.) puts assembly strength into their famous "Swingin' Spray" oscillating lawn sprinkler by fastening zinc and aluminum parts with P-K Self-tapping Screws—7 Phillips Head Type Z and 18 Type F. They start right . . . drive right . . . and stay tight.

PARKER-KALON DIVISION, General American Transportation Corporation
Manufacturers of Self-tapping Screws, Socket Screws, Screwnails, Masonry Nails, Wing Nuts and Thumb Screws

PARKER-KALON® fasteners

Sold Everywhere Through Leading Industrial Distributors
Factory: Clifton, New Jersey—Warehouses: Chicago, Illinois—Los Angeles, California



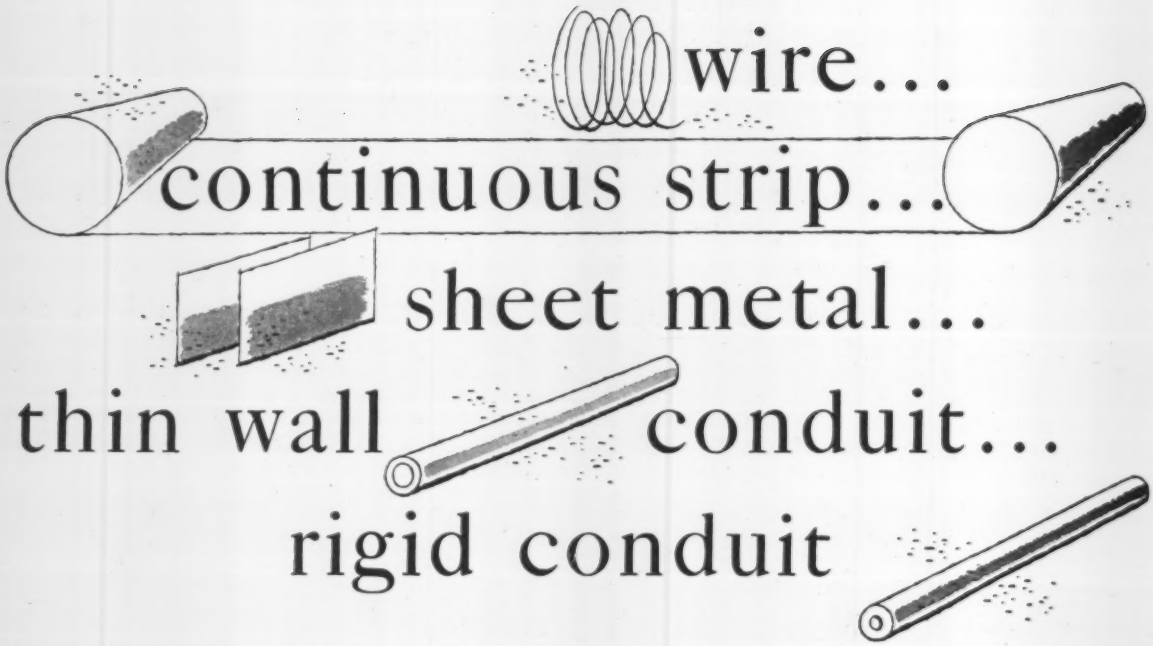
200-ton heats for 24-foot Lectromelt Furnace in Southern steel plant

First of two 24-foot Lectromelt furnaces installed to expand metal making facilities in a Southern steel plant. Present heats run 180 tons . . . 200-ton heats planned in the near future.

Lectromelt®

Catalog 9-B describes Lectromelt Furnace equipment. For a copy, write Lectromelt Furnace Division, McGraw-Edison Company, 323 32nd Street, Pittsburgh 30, Pennsylvania.

IF YOU PROCESS...



YOU CAN *Automate* ALL THESE OPERATIONS:

- cleaning
- pickling
- plating
- phosphating
- scrubbing
- paint prep
- electrogalvanizing

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with an
H-VW-M CONTINUOUS LINE SYSTEM

WRITE today, at no obligation, for the facts about an H-VW-M System that can bring cost-saving *automation* to your continuous line finishing—a system that can be integrated with your shearing, forming, slitting or annealing operations.

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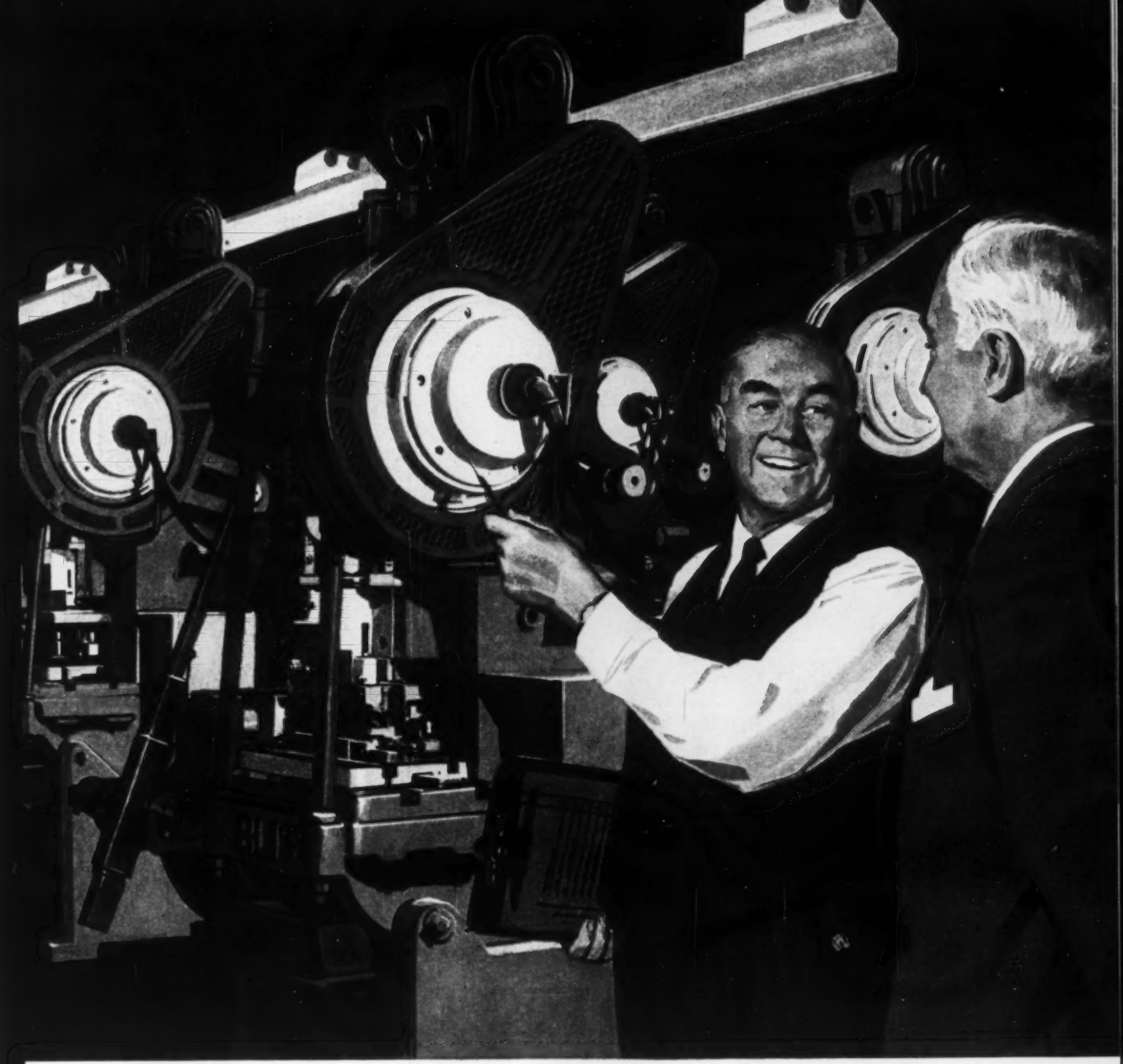


"These 'super-speed' inclinables give me twice the production . . . at about half the cost!"

From their special vibration-absorbing legs to their counterbalanced shafts, these presses are built for speed.

With such special features as bronze gibs...automatic lube systems...special clutches, brakes and flywheels, and equipped with precision feeds, they can knock out short stroke work at better than 500 strokes a minute! They're all new, all Bliss, and the cost is low—surprisingly so.

These are the latest members of Bliss' line—the line that offers industry its most complete choice of types and sizes. And with no axe to grind for any one type, you can be sure of impartial pressroom counsel—by Bliss.

BLISS
SINCE 1857 ®

E. W. BLISS COMPANY · Canton, Ohio

100 years of making metal work for mankind

PRESSES • ROLLING MILLS • ROLLS • DIE SETS • CAN MACHINERY • CONTRACT MFG.

As filled capsules are inspected at Abbott Laboratories, North Chicago, Illinois, the girl suits the speed of the Jeffrey feeder to her requirements with the hand rheostat.

FLOW CONTROL is possible within wide limits, simply by changing feeder's amplitude of vibration.

A way to do what "can't" be done...

JEFFREY Vibrating Feeders

Jobs once considered too costly, too hazardous, or just plain impossible are being done with Jeffrey electric vibrating feeders . . . handling a tremendous variety of materials, densities from 4 to 400 pounds per cubic foot, one micron in size to four-foot cubes, a few ounces to 2,000 tons per hour.

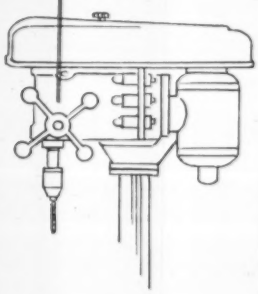
With Jeffrey feeders, the operator has instant and absolute control over the flow of material. This control may be manual or automatic, depending upon equipment that follows, to insure optimum loading. Thus a plant and its workers can produce at top efficiency.

Jeffrey engineers are expert in applying vibrating equipment to all types of processes, and are available to help solve your feeding and conveying problems. Catalog 870 describes these feeders. The Jeffrey Manufacturing Co., 889 North Fourth St., Columbus 16, Ohio.

CONVEYING • PROCESSING • MINING EQUIPMENT...TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

JEFFREY

LET'S *Automate* A DRILL PRESS



There are more hand fed drill presses in use than any other machine tool. They are all pretty much alike. The operator positions the work in a jig or fixture, feeds the drill in and out of the work by turning a star wheel by hand, and removes the work from the jig.

A good workman can drill a clean hole. But not too many of them. It's a tiring job. Towards the end of the shift both quality and quantity suffer.

Let's put a Bellows Drill Press Feed on the star wheel shaft. Now, the operator touches a lever. Automatically the drill is fed in and out of the work, under perfect control. Production is increased 20%-30%; quality is better; tool life longer.

Let's go a step farther. Add a Bellows Rotary Feed Table. Now all the operator has to do is load parts. The table automatically positions the part under the drill. the drill press feed automatically feeds the tool, the table indexes to eject one part and position another. Production is more than doubled, often more than tripled.

How much does such a set-up cost? Roughly five weeks wages of an operator buys it. Actually it costs nothing. It pays for itself, often with the first week's cost savings.

Like to know more about it?

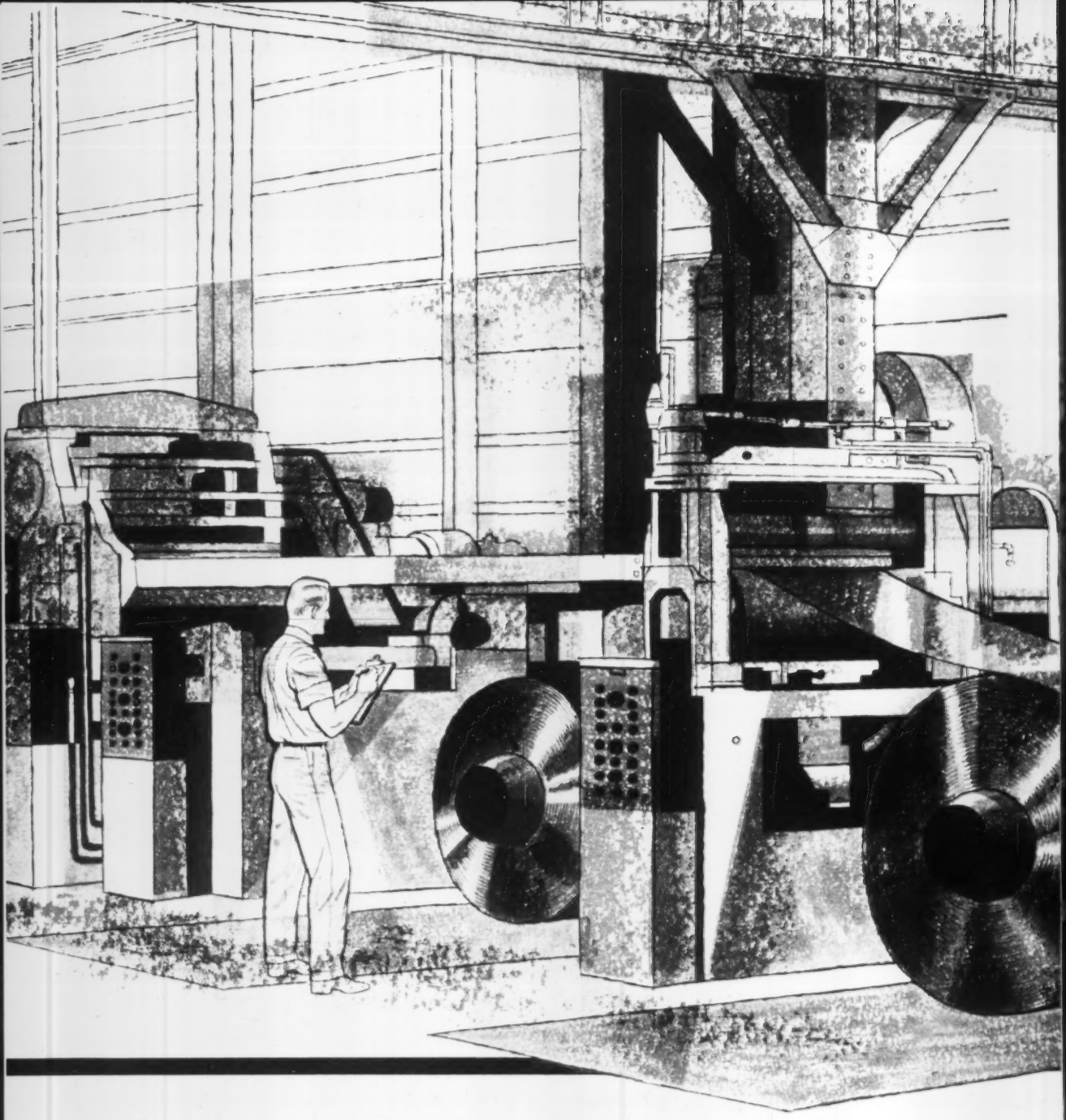
These two free booklets tell the entire story. Write for them today. Address: Dept. ST-1057, The Bellows Co., Akron 9, Ohio. In Canada: Bellows Pneumatic Devices of Canada, Ltd., Toronto, Ontario.

The Bellows Co.

AKRON 9, OHIO

MANUFACTURERS OF CONTROLLED-AIR-POWER DEVICES FOR FASTER, SAFER, BETTER AND **LOWER-COST** PRODUCTION

7678

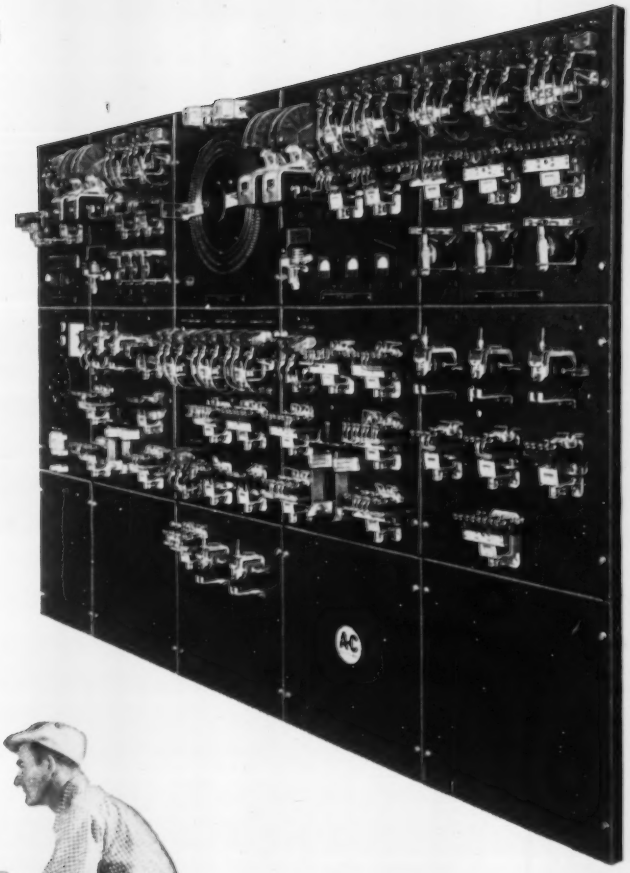


ALLIS-CHALMERS

CONTROL...

from furnace to finish

Fast, Smooth Operation For Your Tinning Lines



For Tinning Lines—
Where high sensitivity and response are essential to continuous operation, dependable magnetic amplifiers provide speed and tension control. Expert engineering coordinates motor and control characteristics for optimum system performance.

The precise speed and constant tension regulation provided by Allis-Chalmers control give you the exact performance necessary to help produce the steel your customers want.

Allis-Chalmers designs control to meet the specific requirements of each particular operation. The result is maximum, coordinated performance. Fast, smooth response with magnetic amplifier regulators provides proper acceleration and deceleration. Top quality components assure the ultimate in long-run efficiency.

Control for all steelmaking needs is an Allis-Chalmers specialty. Planning, designing, coordinating the exact devices for your mill are all part of Allis-Chalmers service. Call your nearest A-C representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

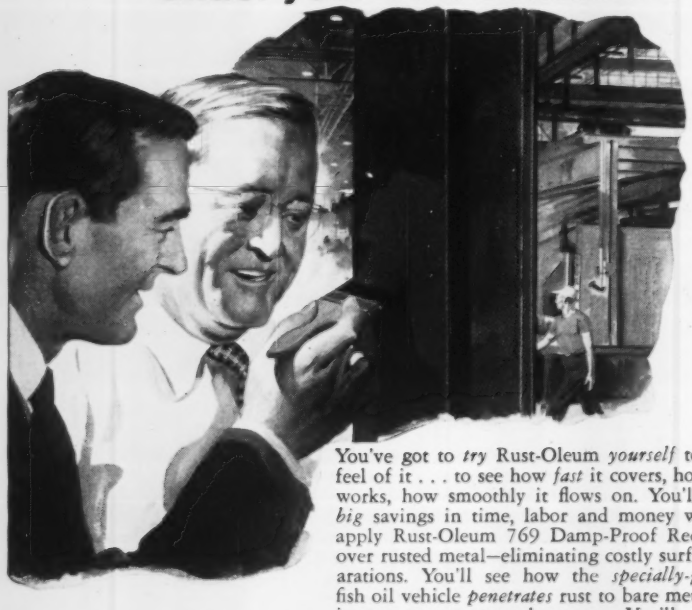
ALLIS-CHALMERS

A-5451

What Rust-Oleum has saved for others is not half so important as the money it can save for YOU...

TRY RUST-OLEUM®

on your rustable metal surfaces under your own conditions

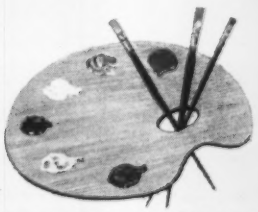


You've got to *try* Rust-Oleum *yourself* to get the feel of it . . . to see how *fast* it covers, how *easy* it works, how smoothly it flows on. You'll see the *big* savings in time, labor and money when you apply Rust-Oleum 769 Damp-Proof Red Primer over rusted metal—eliminating costly surface preparations. You'll see how the *specially-processed* fish oil vehicle *penetrates* rust to bare metal where it stops rust to assure long wear. You'll say you've never used a coating that went on so easily and covered so well. Try Rust-Oleum *soon*—in your plant or around your home. Write for illustrated literature with color charts.

Rust-Oleum Corporation, 2514 Oakton St., Evanston, Ill.

APPLY DIRECTLY OVER SOUND RUSTED METAL

No costly surface preparations usually required—just scrape and wire-brush to remove rust scale and loose rust—then brush Rust-Oleum 769 Damp-Proof Red Primer right over the remaining rust.



MANY ATTRACTIVE COLORS TO BEAUTIFY AS YOU PROTECT

Colors, colors, colors—they're yours in many attractive Rust-Oleum finish coatings—including Aluminum, White, Red, Gray, Green, Blue, Yellow, Black and many more.

DISTINCTIVE AS YOUR OWN FINGERPRINT

Rust-Oleum is *exclusive*—with a specially-processed fish oil vehicle in both primers and finish coatings. Accept no substitute. Prompt delivery from Industrial Distributor stocks.

Write for special thirty-page report showing how Rust-Oleum penetrates rust to bare metal.

RUST-OLEUM® STOPS RUST!®

Rust-Oleum and Stops Rust are brand names and registered trademarks of the Rust-Oleum Corporation.

Who SAYS I'm not interested in a buy and sell agreement ?

"Sure I am! Every guy ought to be interested in the future of his dad's business!"

Whether you are owner, partner, stockholder or key executive, the future of your business — and your family — may well depend upon a sound buy and sell agreement secured by an adequate business life insurance plan.

Death can bring financial chaos to any business — and extreme hardship to the families involved.

An Ætna Life Representative will be pleased to work with you, your lawyer and accountant in setting up a properly insured plan to provide in advance for the smooth and orderly transfer of your business.

ÆTNA BUSINESS LIFE INSURANCE PLANS ARE SPECIALLY DESIGNED . . .

- To protect PARTNERSHIPS against liquidation or reorganization.
- To protect SOLE PROPRIETORSHIPS for heirs or selected employees.
- To protect CLOSE CORPORATIONS from forced reorganization.
- To cover the loss of a KEY MAN in any organization.

Add Life to your Business with Ætna Business Life Insurance

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Gentlemen:

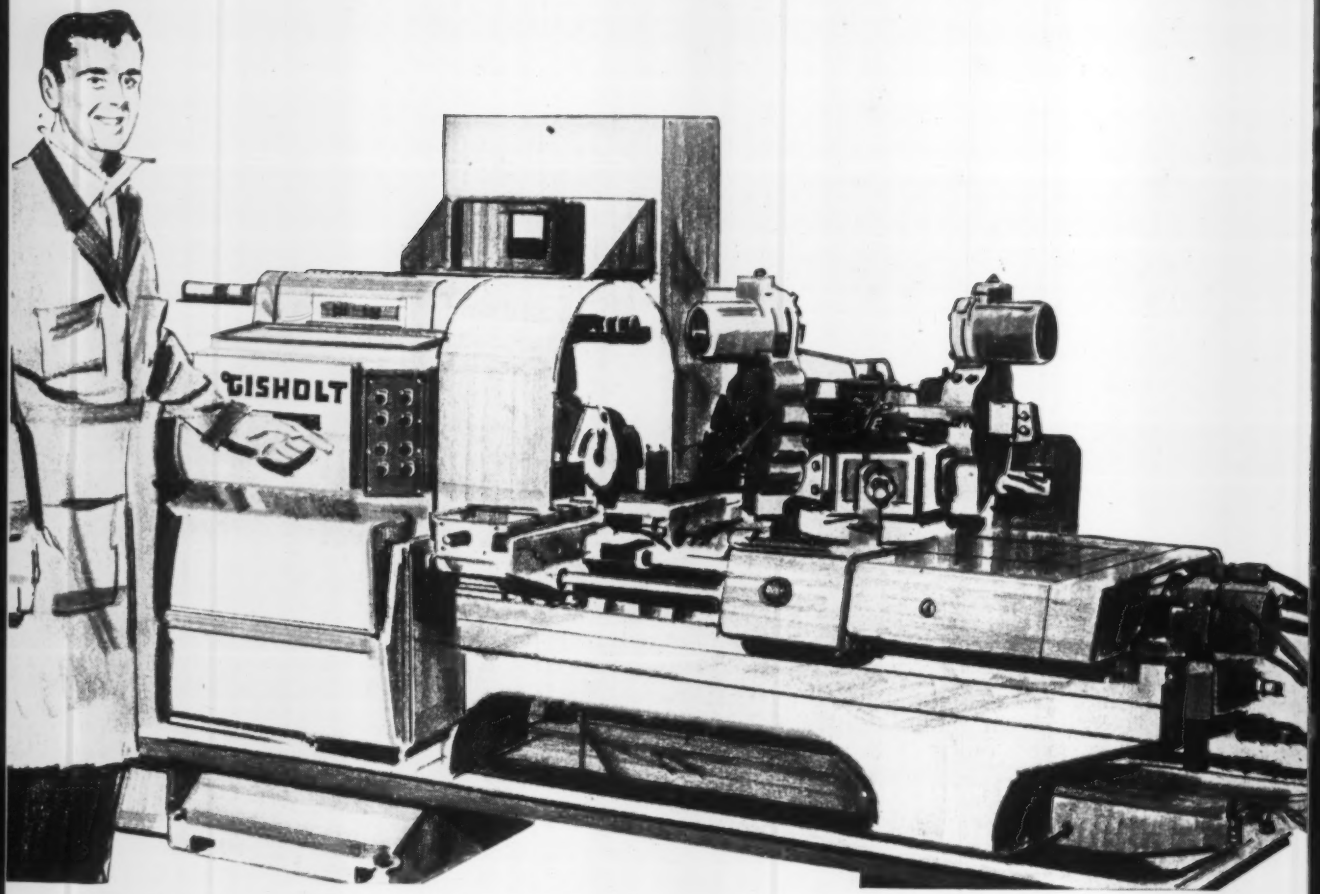
Please send me a copy of your new booklet "Will This Man Take Your Business With Him When He Dies?"

Name_____

Address_____

NEW Gisholt Fastermatic

CUTS YOUR SETUP TIME



GISHOLT
MACHINE COMPANY
Madison 10, Wisconsin

MASTERLINE
GISHOLT
SINCE
1887

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • PACKAGING MACHINES • MOLDED FIBERGLAS PLASTICS

control panel

50% OR MORE

BY SIMPLY FLIPPING TOGGLE SWITCHES, your operators can cut automatic turret lathe setup time 50% or more with this electric setup control panel.

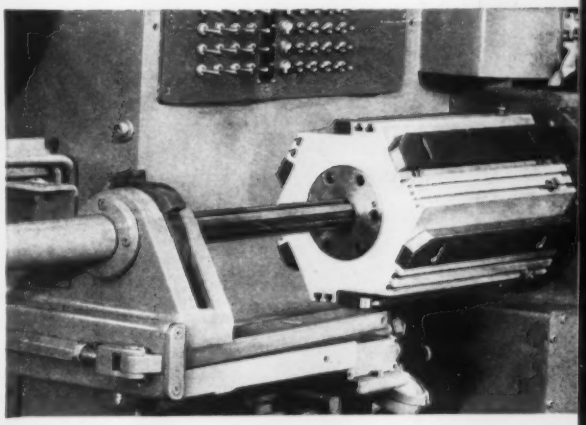
Thoroughly proved in production lines, this control panel is one of the many advanced features available on the new Gisholt MASTERLINE Fastermatic Automatic Turret Lathe.

Here's how the panel works: within finger-tip reach, your operator has a horizontal row of toggle switches for each face of the hexagon turret. By simply flipping the switches right or left, he pre-selects desired machine functions. Re-runs? Here the Fastermatic makes even more drastic cuts in setup time. A master reference card, made from the previous run, is used, and the machine is ready to go with absolute minimum preparation. Feed changes are fast and easy. Tool overhang is quickly minimized by re-positioning the saddle. Anywhere within the machine cycle, the operator can make a trial cut, withdraw the tools, mike the part, re-set the tools and resume forward feed.

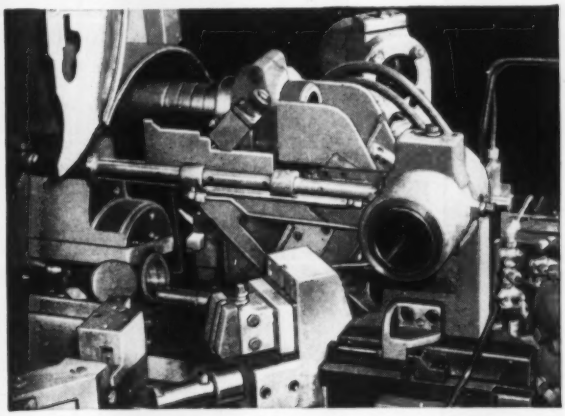
What does this versatility mean to your own operations? It means more time spent cutting chips and more profit per piece. It means that less skill is required of the operator and he is free to handle additional units or do other work during machining cycles. It means you can utilize smart tooling and eliminate human errors... get record production on long runs ...*and also get the advantages of automatic cycle operation on relatively short runs.*

Ask your Gisholt Representative to tell you about the Fastermatic's new electric control panel...its increased capacity...its higher speeds and feeds and heavier construction. You'll also want to know about using the Gisholt JETracer on the Fastermatic. Call him today—or write Gisholt for literature...ask for Bulletin No. 1179.

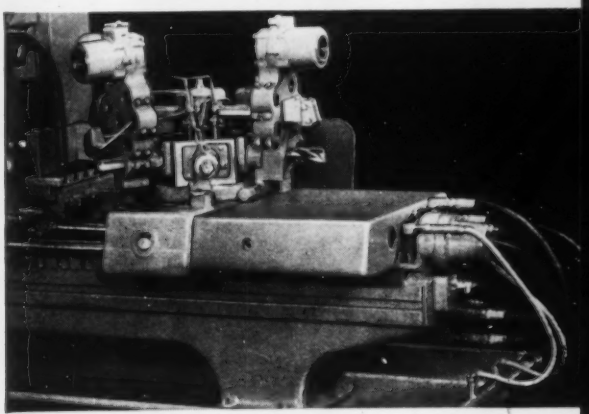
NEW GISHOLT FASTERMATIC CONTROL PANEL—simple toggle switches govern basic machine functions, cutting initial setup time in half. Master reference card is used to cut setup time still more on re-runs.



HEXAGON FEED CONTROL DRUM—positioning of adjustable flat bars on each face determines rate of feed. Thumbscrew actuator pins in slots on each face determine point of change from traverse to feed and length of feed.



GISHOLT JETracer—mounts on any one of Fastermatic's turret stations. Provides exceptional accuracy for turning, boring or facing—either straight, taper or contour. Hydraulically operated; stylus follows contour of template controlling movement of single-point tool on sliding member.



FASTERMATIC TURRET SADDLE is hydraulically powered for indexing and longitudinal movement. Automatic cycle easily set up with turret double- or triple-tooled. CROSS SLIDES—front and rear—operated by forward movement of turret saddle, can work independently, or together, with any turret face.

CYLINDRICAL APPLICATIONS:

UNLIMITED

Sandusky Centrifugal Castings offer you 4 Important Advantages

1. Superior mechanical properties to meet exacting design requirements
2. Uniform soundness—free from harmful inclusions and porosity
3. Highest quality—to insure long, dependable, trouble-free service
4. Job-ready castings—machined to your exact specifications

More and more design engineers are realizing that new applications for centrifugal castings are *unlimited* . . . thanks to new knowledge about alloys . . . new casting and machining techniques and facilities.

From simple bushings to atomic reactor components . . . from bronzes to heat, corrosion, and abrasion resistant stainless steels . . . from 7" to 54" O.D. and lengths to 33 ft.—Sandusky centrifugal castings are providing gratifying results in scores of applications, many unheard of a few years ago.

What cylindrical or piping problem can we help you solve? . . . Code pressure vessels? . . . Reactor vessels? . . . Power Piping? . . . What is your problem?

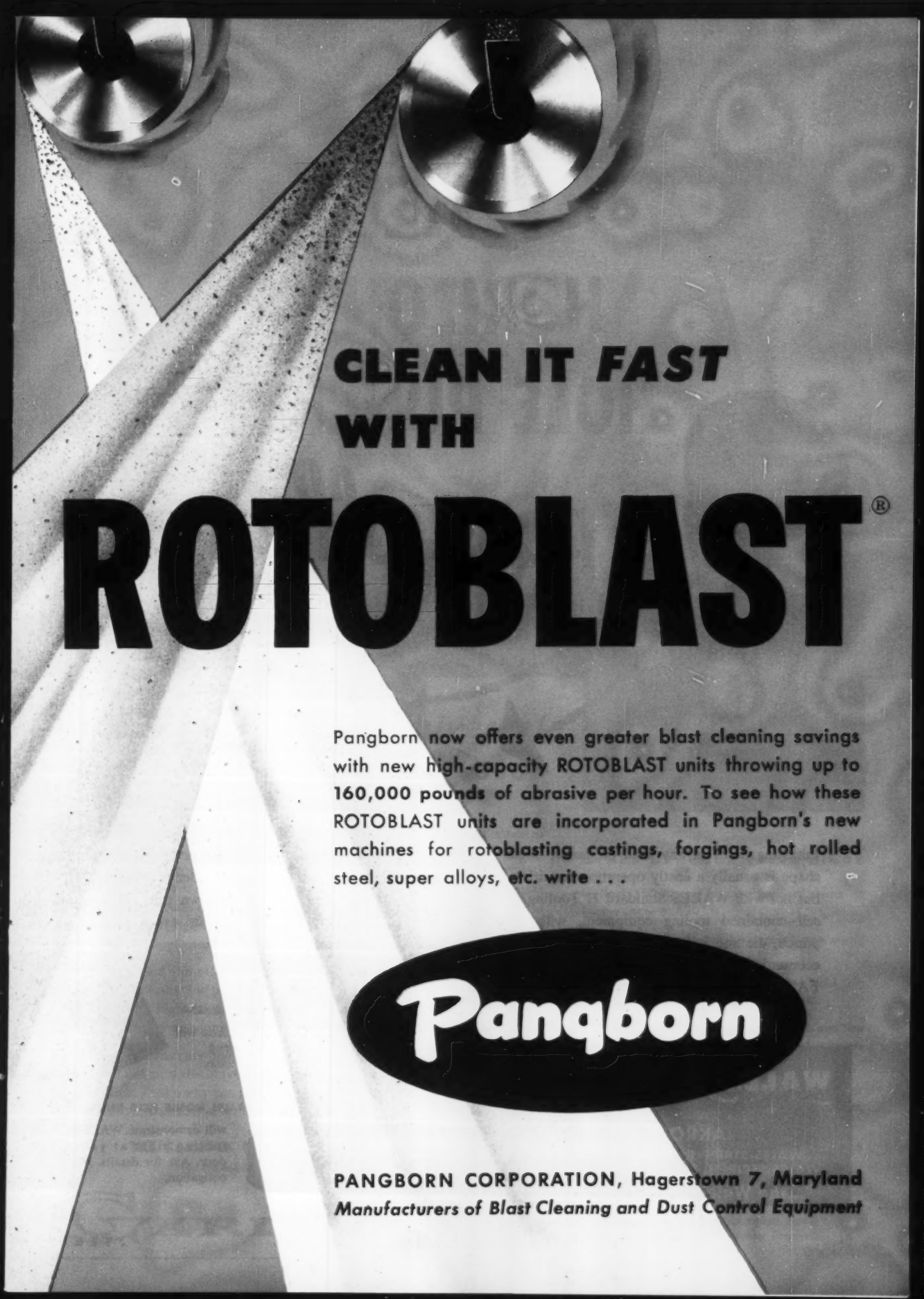
Your inquiry will bring more information promptly . . . or, if you prefer, a personal call by one of our engineers.

See our Display in Booth No. 1731 at the METAL SHOW

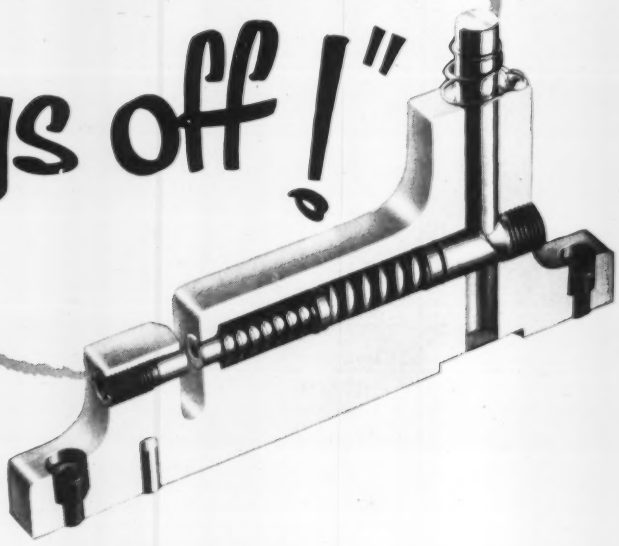
CENTRIFUGAL CASTINGS

Sandusky Foundry & Machine Company

SANDUSKY, OHIO • *Stainless, Carbon, Low Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys*


CLEAN IT FAST
WITH
ROTOBLAST®
Pangborn now offers even greater blast cleaning savings with new high-capacity ROTOBLAST units throwing up to 160,000 pounds of abrasive per hour. To see how these ROTOBLAST units are incorporated in Pangborn's new machines for rotoblasting castings, forgings, hot rolled steel, super alloys, etc. write . . .
Pangborn
PANGBORN CORPORATION, Hagerstown 7, Maryland
Manufacturers of Blast Cleaning and Dust Control Equipment

"WALES HORIZONTAL HOLE PUNCHING pays off!"



Punching holes in any kind of flange, angle, channel or shape is usually a costly operation requiring custom dies, but not with WALES Standard H Tooling. This exclusive self-contained tooling equipment, with interchangeable punch, die and stripping mechanism makes possible fast, economical hole punching. WALES H Tooling insures FAST set-up with automatic alignment and the same equipment may be used over and over again in any number of patterns. Bench assembly virtually eliminates press down time. H Tooling is available to meet your every production requirement.

SEND FOR BULLETIN NO. 25J

This fact filled Bulletin will give you the details. Send for your copy today.

WALES MOBILE FIELD UNITS

will demonstrate WALES tooling right at your door. Ask for details. No obligation.

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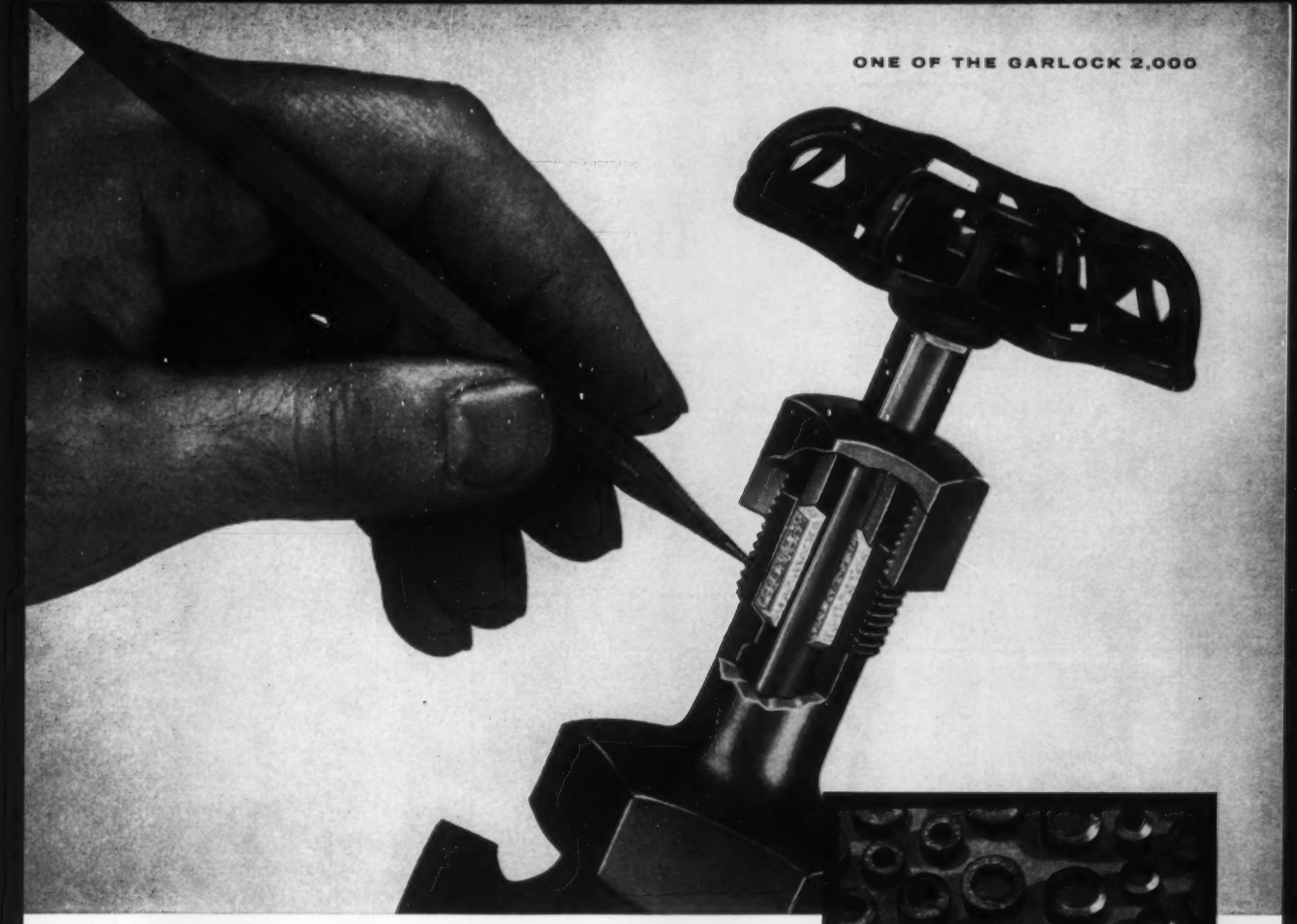
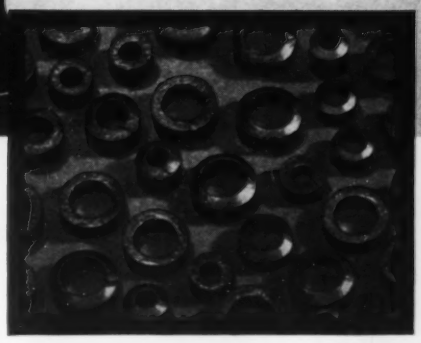
"...the Wales-Way is the PLUS-PROFIT way"

ONE OF THE GARLOCK 2,000





NEW – *The Most Universal Valve Packing Ever Developed!*

New Garlock 5022 is the nearest thing to a universal valve stem packing. Its many advantages far outweigh its slightly higher cost. Made of asbestos and TEFLON* pressed into a dense die formed ring, the new packing stands up against steam, water, mild acids, alkalies, and solvents. It is clean, cannot contaminate or discolor the product handled. It contains no graphite or lubricant; the TEFLON acts as an excellent lubricant yet does not exude, dry out, or burn out. Withstands temperatures to 500° F. Ideal for original equipment such as valves, faucets, appliances, etc.

Garlock 5022 and the other Garlock Molded Valve Rings listed at right are available specifically for production line use where accurately sized packings are required for high speed assembly. They are furnished in quantities of 500 and over, in many standard sizes or to your exact specifications.

Molded Valve Rings are another important part of the Garlock 2,000 . . . two thousand different styles of packings, gaskets, and seals for every need. The *only* complete line. That's why you get unbiased recommendations from your Garlock representative. Call him or write for Valve Ring Data.

OTHER GARLOCK VALVE RINGS

Garlock 160 Rings for use against steam at temperatures to 600° F.

Garlock 161 Rings for use against cold water and alcohol.

Garlock 162 Rings for use against cold oil, gasoline, benzol, chlorinated solvents, etc.

Garlock 163 Rings for use against high and low pressure steam, water, alcohol and some aqueous solutions.

Garlock 166 Rings for use against steam or gases to 600° F. hot or cold water, oils and solvents.

*DuPont Company Trade Mark

THE GARLOCK PACKING COMPANY, Palmyra, New York

For Prompt Service, contact one of our 30 sales offices and warehouses throughout the U. S. and Canada.

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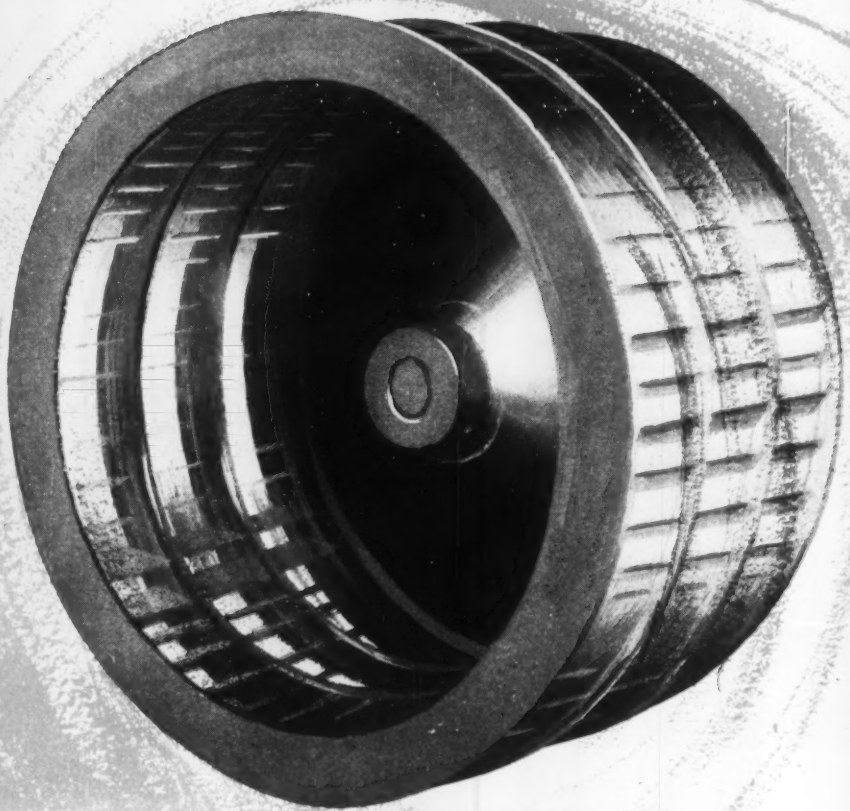
Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

HEAT • WEAR • CORROSION

HAYNES Alloys solve the

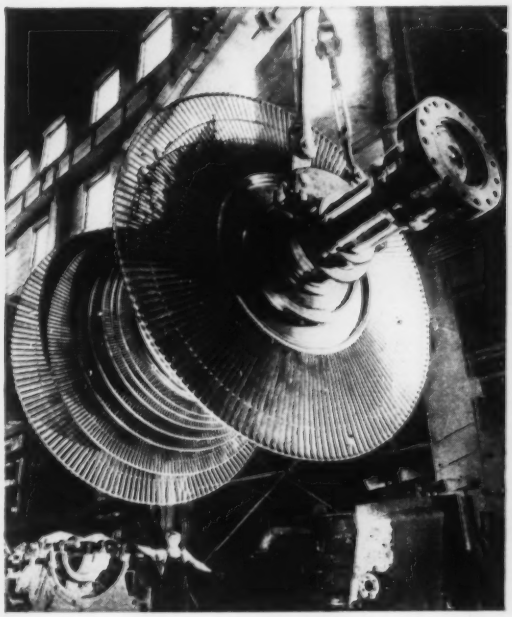


HEAT

10 Years' Service at 1600 to 1800 deg. F.

Rotors and impellers made of MULTIMET alloy are being used to circulate the atmosphere inside heat-treating furnaces where temperatures range from 1600 to 1800 deg. F. They are expected to last 10 years even though they are exposed to both reducing and oxidizing conditions.

tough problems



EROSION

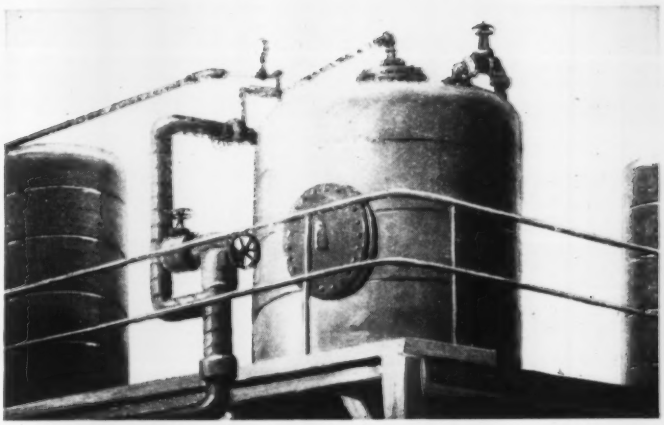
Withstands High Velocity Erosion for 19 Years

Blading at the cold end of steam turbines spins at speeds approaching that of a high speed bullet. At these high velocities even small water particles can cause rapid wear on most metal parts. Yet when the leading edges of these blades are protected by a 27-in. strip of HAYNES STELLITE alloy, they remain in operation up to 19 years!

HAYNES alloys give long, dependable service under some of industry's toughest conditions. They operate for long periods of time at temperatures up to 2000 deg. F; they resist the severe corrosive action of many chemicals; and they withstand the wearing effects of abrasion and erosion.

There are over 100 HAYNES alloys—a wide selection that practically guarantees you a tailor-made solution to your heat, abrasion, or corrosion problems. Many of these alloys are available as sheet, plate, bar stock, tubing, wire, sand castings, investment castings, welding rods, hard-facing rods, and metal-cutting tools.

For complete details on properties, prices, and forms, write for literature, or contact our nearest sales office... HAYNES STELLITE COMPANY, Division of Union Carbide Corporation, Kokomo, Indiana. Sales Offices in Chicago, Cleveland, Detroit, Houston, Los Angeles, New York, and San Francisco.



CORROSION

Resists Chlorine Compounas at 300 deg. F.

Vessels lined with HASTELLOY alloy C last from 2 to 4 years while handling such severely corrosive media as hydrochloric acid, tri-chlor benzene and other chlorine compounds. Because of the unusual resistance of HASTELLOY alloy C to a variety of corrosives, it is widely used in the Petroleum, Chemical Processing, Metalworking, and many other industries.

HAYNES
ALLOYS

HAYNES STELLITE COMPANY
Division of Union Carbide Corporation
Kokomo, Indiana

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METAL STRIPPERS

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Since 1930, ENTHONE Incorporated has developed and brought to the metal finishing market many specialty products and processes. Often these products have provided the answers to finishing problems previously unsolved. ENTHONE ENSTRIPS, for example, are patented products for the selective dissolving of one metal plated on another without attacking the base metal.

ENSTRIP A — U.S. Patent No. 2,649,361 — was the first product ever offered for dissolving nickel plate without attack on the steel basis metal.

ENSTRIP 165-S — U.S. Patent No. 2,698,781 — was the first product ever offered for dissolving nickel from copper base alloys without attack on the basis metal. And there are many other selective strippers in the ENSTRIPS group to meet all requirements.

If you have a metal finishing problem, ask ENTHONE *first!* Write now for the folder "They are HERE . . ." describing **20** ENTHONE answers to difficult finishing problems.

ENTHONE INCORPORATED

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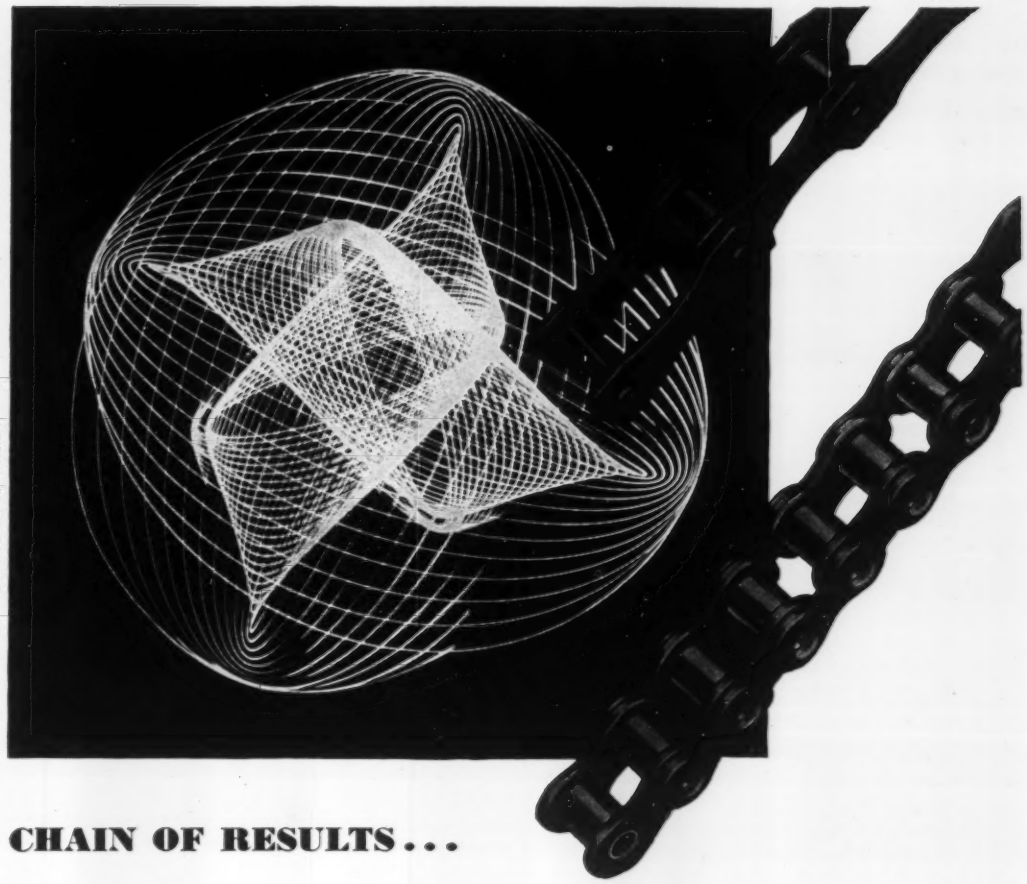
Metal Finishing Processes • Electroplating Chemicals



CHAIN OF RESULTS . . .

Whitney's Self-Lubricating Single and Double Pitch Roller Chain and *fatigue resistant* Processed Roller Chain are design advancements that get results for machine manufacturers and users in many industries.

They should. For example, Self-Lube Roller Chain outlasts regular chain as much as 5 to 1 under rugged field conditions subject to extremes of dust or mud. In addition, they are widely used on processing equipment where cleanliness is vital and where external lubrication is not practical or desirable. Here, Whitney's exclusive sintered steel chain bushings "oil from the inside" . . . are prelubricated for life.

Whitney's exclusive *fatigue resistant* Processed Roller Chain is establishing new service standards for durability, particularly on problem drives involving unusual operational conditions, stresses and heavy shock loads. This performance comes from the exclusive Whitney *fatigue resistant* process which offsets excessive operational stresses in the chain.

These new dynamic, balanced designs serve better, longer and at less over-all cost. And so does the entire Whitney line of A.S.A. Roller, Silent and Conveyor Chain Drives . . . all precision engineered for top quality.

Whitney Field Engineers provide nation-wide consultant service, backed up by company operated warehouses and alert Whitney Distributors offering a complete off-the-shelf stock service. If you want RESULTS specify WHITNEY CHAIN.

Whitney

CHAIN COMPANY

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ROLLER CHAIN • SILENT CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS

Is your present quenching oil providing the uniform hardness you require? Rejects running too high? Gulf Petro-engineering Service can save you money here!

Put a trained petroleum man on your staff...get GULF PETRO-ENGINEERING SERVICE

You don't have to be a Gulf customer to make use of Gulf Petro-engineering Service. If you have any problem involving petroleum products, or just want to be sure you're keeping pace with new developments in this highly technical field, consult your Gulf Sales Engineer.

His suggestions quite often lead to better equipment performance, greater production, worth-while savings in maintenance costs. He can give you a great deal of assistance, because he's backed by more than 1,300 Gulf scientists, chemists, metallurgists, engineers. You can benefit from their wide experience—through Gulf Petro-engineering Service.

What kind of help can you expect? Well, for example, practical help in the proper selection, storage and use of fuel oils, lubricating oils, cutting oils, rust preventives, greases, solvents, waxes, and process oils . . . complete information on new developments in petroleum science . . . effective aid on many problems.

Gulf Petro-engineering Service is available to you through 99 Gulf District Sales Offices and 8 Division Sales Offices. Consult your local telephone directory for the nearest Gulf office. Or write us for new 24-page booklet covering this new and important service to American industry.

GULF OIL CORPORATION
1822 Gulf Building
Pittsburgh 30, Pa.

GULF

NEWS FROM HAMILTON!

100 to 300 ton press line sets new standards

Hamilton offers you 100 to 300 ton presses built to meet exacting automotive production standards . . . standards pioneered in the automotive field through more than 30 years of Hamilton's leadership in building presses.

Every one of these 2 point, single acting, straight-side, double-crank presses is a brand new design. Each is engineered for constant top-speed, top-quality production — without profit-robbing downtime. Each is built for complete operating flexibility. Here are a few of Hamilton's design features that will mean more efficient operation for *you:*

- **mechanically interlocked air clutch and brake**
- **barrel-type motorized slide adjustment**
- **automatic lubrication**
- **pneumatic flywheel brake**
- **die lights**
- **die cushions**
- **pneumatic counterbalances**
- **interlocked electrical clutch control**

Exact specifications are adjustable to your individual requirements. Special electrical controls are available to meet particular electrical standards.

It will mean money in your pocket to find out today how these all-new Hamilton presses can help you turn out high quality stampings fast . . . without costly production downtime. Get the full story on these new 100 to 300 ton presses . . . from Hamilton Division, B-L-H Corporation, Hamilton, Ohio.

Hamilton's brand-new 250 ton double-crank press with 84 x 42 in. bed and slide.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical and hydraulic presses • Can making machinery • Machine tools

Make Iron Ductile with Magnesium Ferrosilicon

Mg

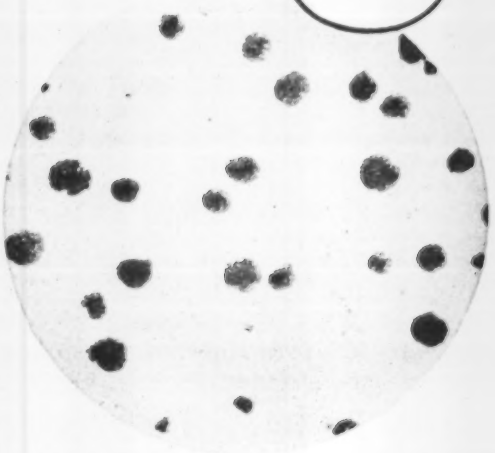
The microstructures shown at the right illustrate how an addition of magnesium converts flake graphite to a spheroidal type and is the key element in the production of "ductile" or "nodular" iron. An economical and convenient source of magnesium for these irons is ELECTROMET magnesium-ferrosilicon. This ladle-addition alloy can be added to iron made in either the cupola or electric furnace and is available in three grades, including 0.5 and 2 per cent cerium-bearing grades. Cerium neutralizes certain elements which inhibit the formation of spheroidal graphite. All three grades contain 1.00 to 1.60 per cent calcium which intensifies the spheroidizing action of magnesium.

To obtain the best combination of ductility and freedom from chill in light sections, the magnesium-ferrosilicon addition is usually followed by a post inoculation with ferrosilicon. ELECTROMET calcium-bearing 85 per cent ferrosilicon is an improved grade used by many ductile iron foundries.

For further information and technical assistance, contact ELECTROMET, supplier of alloys for gray, ductile, and malleable iron.

ELECTRO METALLURGICAL COMPANY, Division of Union Carbide Corporation, 30 East 42nd Street, New York 17, N. Y. In Canada: Electro Metallurgical Company, Division of Union Carbide Canada Limited, Toronto.

Offices: Birmingham, Chicago, Cleveland, Detroit, Houston, Los Angeles, Phillipsburg, N. J., Pittsburgh, and San Francisco.



Note in the top micrograph how the graphite flakes break up the continuity of the gray iron matrix, causing low strength and brittleness. In the bottom micrograph, the addition of a small amount of magnesium has changed the graphite structure from flake to the spheroidal type which has less effect on the continuity of the matrix. This "ductile" or "nodular" iron structure is therefore stronger, tougher, and more ductile.

Electromet
FERRO-ALLOYS AND METALS

UNION CARBIDE

NOTE: Since patents cover the use of magnesium in the production of ductile iron, we suggest that you investigate how these patents might affect you.

The terms "Electromet" and "Union Carbide" are registered trade-marks of Union Carbide Corporation.

SCREWSTICK is easy to insert into power driver, lets you drive a fastener as fast as you can find the hole.

SCREWSTICK saves money. It can cut assembly costs by as much as 4 to 1

It can do this because SCREWSTICK feeds fasteners automatically from a power driver in a one-piece stick of identical fasteners. It eliminates manual handling of small screws, stops costly fumbling and combines high fastening strength with quick assembly.

Just as important is the ease of alignment between the screw and threaded hole and a constant, measured torque which is built into the product that provides uniform tightening.

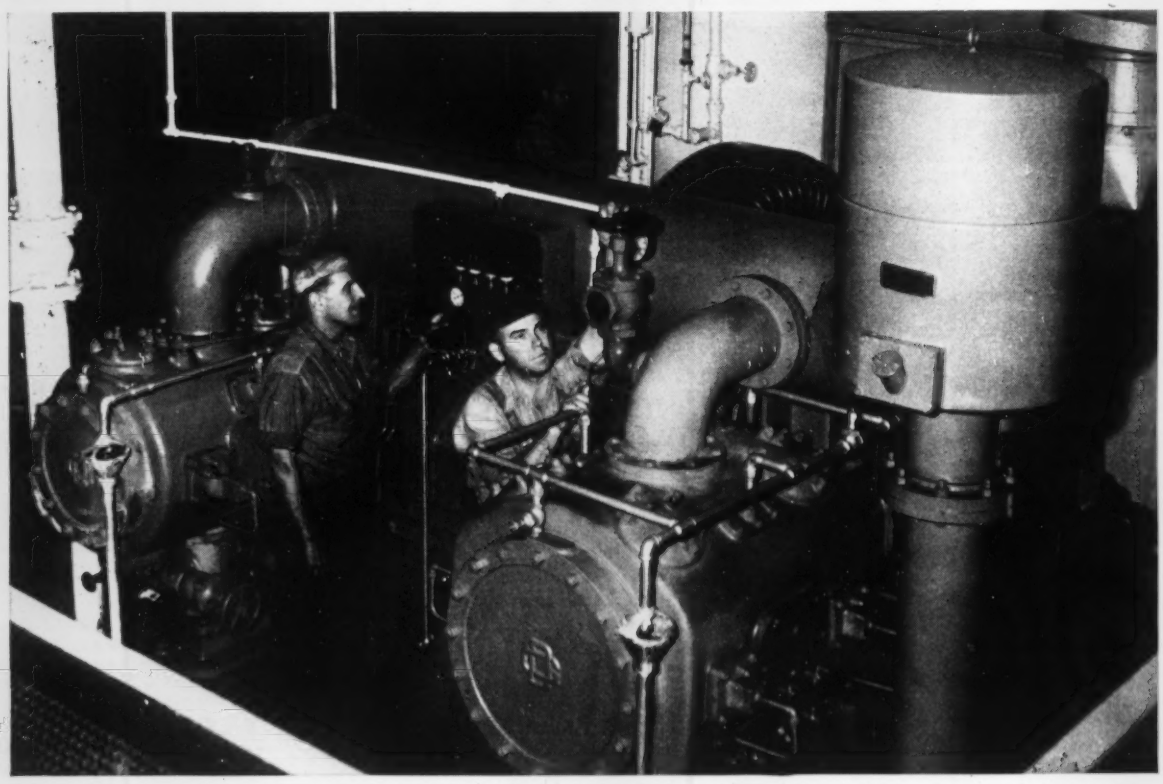
SCREWSTICK is readily adaptable to compact, lightweight, portable drivers. Sizes from No. 0 to No. 6 in diameter, custom-engineered in machine screw or self-tapping types to meet your own requirements. They are mass-produced in the convenient, easy-to-handle SCREWSTICK form.

Find out for yourself how you can apply precision and ease of assembly to reduce assembly costs. Take advantage of American's custom engineering service for your fastening applications.

The biggest news in fasteners comes from . .

American!

AMERICAN SCREW CO., WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICH.

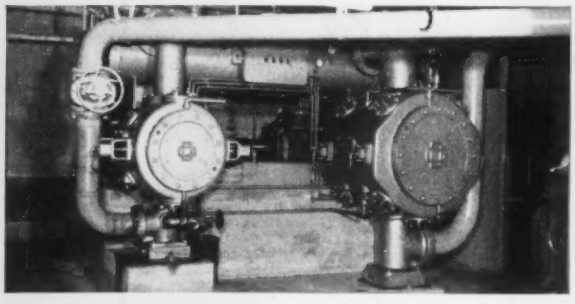


18 & 11 x 12 HAE compressor supplies 'round-the-clock air power in an aircraft plant.

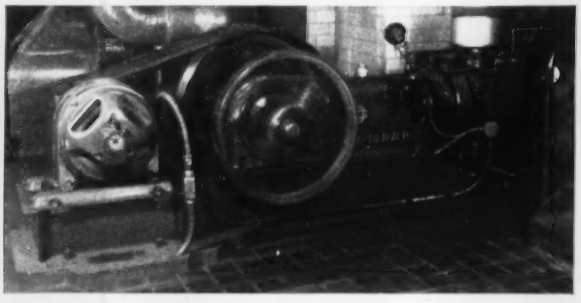
"WE WANT 'ROUND-THE-CLOCK AIR POWER— Gardner-Denver compressors give it to us"

Here's why they picked this Gardner-Denver heavy-duty, full-load compressor for continuous service:

- Completely enclosed main frame with removable, bolted cover plates . . . working parts easy to reach for inspection and adjustment.
- Gasketed covers keep oil in . . . dirt out.
- Two crankshaft counterweights for better balance . . . greater efficiency . . . longer service life.
- Factory-trained staff for technical and engineering service from convenient branch offices.



Midwest metalworking plant relies on this HAE compressor for air power. Ask for Bulletin HAC-36.



9 x 9 RX compressor delivers air to container plant. Ask for Bulletin HAC-40.

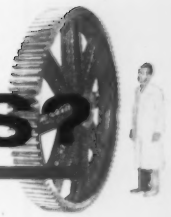
ENGINEERING FORESIGHT—PROVED ON THE JOB
IN CONSTRUCTION, MINING, PETROLEUM AND GENERAL INDUSTRY

GARDNER - DENVER

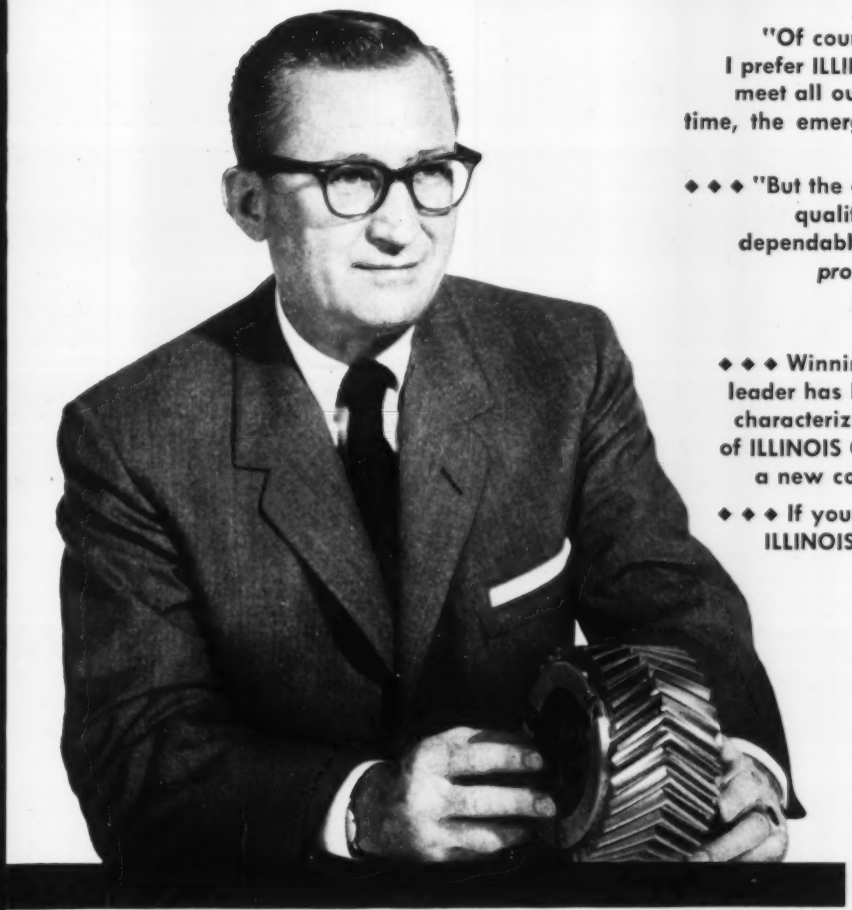
Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

WHY BUY ILLINOIS GEARS?



THE ANSWER IS QUALITY... EVERYTIME!

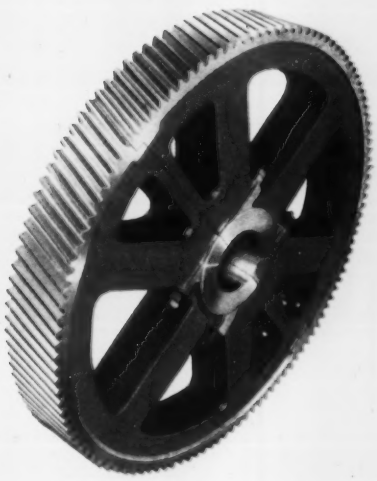


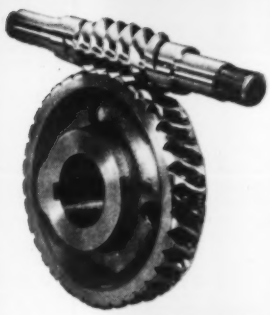
"Of course, there are many reasons why I prefer ILLINOIS GEARS. I like the way they meet all our specs, the way they deliver on time, the emergency service we get when we need it—to mention a few.

◆ ◆ ◆ "But the one thing I like most of all is the quality of ILLINOIS GEARS—enduring, dependable quality I can trust because it is *proven by performance* . . . one more reason why we feel they are our most economical buy."

◆ ◆ ◆ Winning this recognition as the quality leader has been rightfully earned because it characterizes every step in the manufacture of ILLINOIS GEARS—a creed that established a new concept of quality in gear making.

◆ ◆ ◆ If you are not now using or specifying ILLINOIS GEARS find out about the gears that are *made right with quality as the first consideration.*





Look for this mark ILL® *the symbol on finer gears*

Gears for Every Purpose ... one gear or 10,000 or more

ILLINOIS GEAR & MACHINE COMPANY

2108 NORTH NATCHEZ AVENUE • CHICAGO 35, ILLINOIS

HILL GRINDING AND POLISHING MACHINES

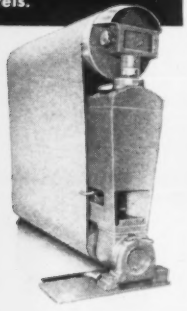
For FINISHING

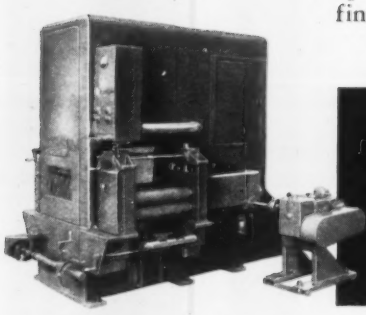
Any and All

FERROUS and NON-FERROUS MATERIALS . . .

HILL Polishing Machine
(Hydraulic Table Type)
For polishing individual sheets and plates. Hydraulic reciprocating table with centralized controls.

The basic HILL two-roll vertical head with upper steel idler roll and lower rubber covered contact or work roll (both dynamically balanced) over which the endless abrasive belt travels.





HILL Grinding and Polishing Machine
(Pinch-roll Type)
For pre-finishing, conditioning and polishing. Used as single units or in multiple units for progressive line polishing in wet or dry operations.

FLAT surfaces of ferrous or non-ferrous material can be brought quickly to the high finish so necessary for today's industrial and consumer products. The dairy, automotive, home appliance and engraving industries are typical of the wide range of application for these precise, labor saving machines.

HILL abrasive belt grinding and polishing machines are built in two general types. The hydraulic reciprocating table type polished individual sheets and plates. Table widths vary from 36″ to 60″. Table lengths range from 60″ to 240″. The Pinch-Roll type is for progressive line polishing. The HILL two-roll vertical head with endless abrasive belt is the basic principle common to both types.

When writing for information please indicate size and specifications of stock to be finished.

HILL ACME TOOLS FOR INDUSTRY

THE HILL ACME COMPANY

HILL DIVISION
ESTABLISHED 1882
1201 West 65th Street • Cleveland 2, Ohio

"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • "CLEVELAND" KNIVES • SHEAR BLADES

Ski lift operators stress safety when it comes to buying wire rope. Too many lives are at stake. So they buy . . .

A Safe Lift

Even though you don't operate a ski lift, false economy can be costly in your rope purchases, too. For a rope failure can cause personal injury . . . wreck your equipment . . . throw off your entire work schedule . . . and affect employee morale. Yes, a "bargain" wire rope may save you money, yet cost you your peace of mind. Don't take a chance. Buy a rope that's a quality rope—buy Wickwire Rope.

WICKWIRE ROPE
A CF&I PRODUCT

CF&I

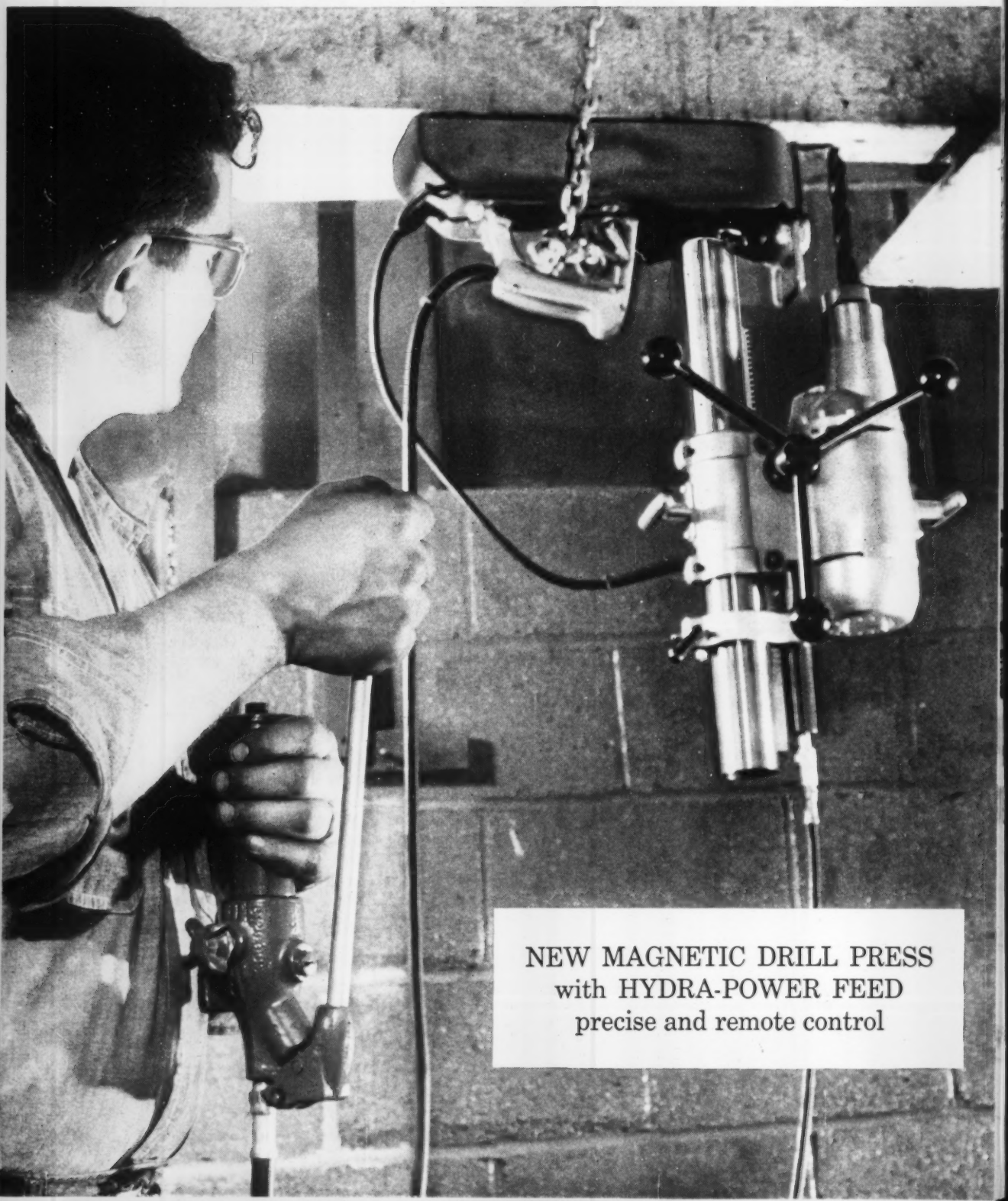
LOOK FOR THE YELLOW TRIANGLE

PRODUCT OF WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION

5050

THE COLORADO FUEL AND IRON CORPORATION — Denver • Houston • Odessa (Tex.) • Phoenix • Salt Lake City • Tulsa
PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland • San Francisco • Seattle • Spokane
WICKWIRE SPENCER STEEL DIVISION — Boston • Buffalo • Chattanooga • Chicago • Detroit • Emlenton (Pa.) • New Orleans
New York • Philadelphia

Takes the tough jobs.



..standing on its head!

Mail coupon below for free demonstration of NEW Black & Decker Magnetic Drill Press!

Stable, one-piece power unit, built-in drill point locator insure finest precision!

The new B&D Magnetic Drill Press is so loaded with user-wanted features—that it just has to be seen to be appreciated. To see it at work on your own application, mail coupon below for a free demonstration.

For instance: Its exclusive two-piece construction makes it simple to position the magnet. The built-in drill point locator makes accurate placement effortless. An easy twist of the 1¼" capacity drill press unit locks it in place on the magnet.

And it's there to stay! Extra power magnet clings to ½" and thicker steel with a giant's grip. This new B&D Magnetic Drill Press needs no cool-off period. It's stable in any direction, provides highest accuracy at all times.

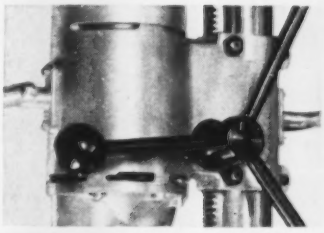
Like the full line of B&D Portable Drills, this new tool is power-packed, quality built. See it for yourself. Mail coupon for free demonstration to THE BLACK & DECKER MFG. Co., Dept. 2010, Towson 4, Md. (In Canada: P.O. Box 278, Brockville, Ont.)

Look Under "TOOLS-ELECTRIC" in Yellow Pages

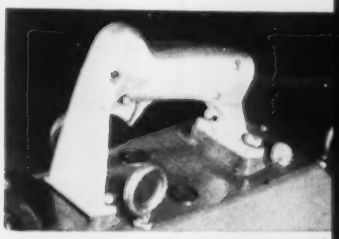
Leading Distributors Everywhere Sell

Black & Decker®

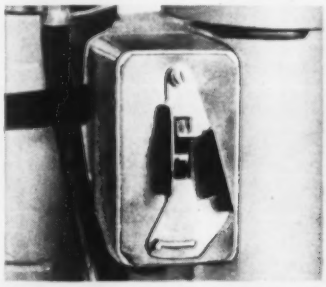
Quality Electric Tools—Power-built to set the pace



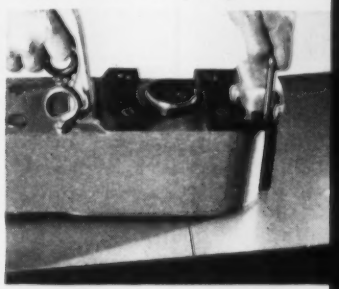
UNITIZED CONSTRUCTION of drill press cannot work loose, no side play, maintains highest accuracy.



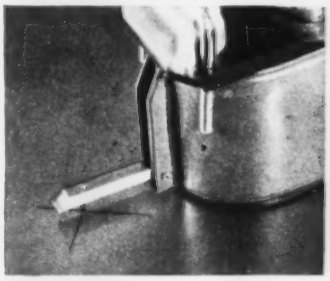
SAFETY-GRIP SWITCH keeps magnet always "on" after operator releases switch trigger—another safety plus.



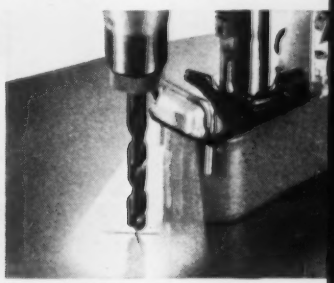
REVERSING SWITCH with time delay prevents motor being reversed too rapidly. Adds longer life—increases safety.



VERSATILE MAGNETIC UNIT can be used apart from drill press to hold pieces for butt welding and other jobs.

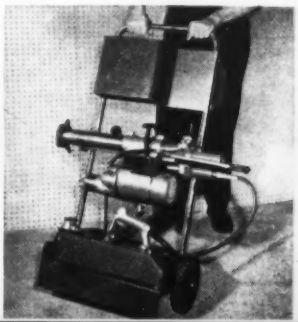


DRILL POINT LOCATOR provides accuracy never before possible. Gets close tolerances fast. Built into magnet.



EXCLUSIVE HEADLIGHT directs bright beam on work area. Special ruggedized bulb withstands hard usage.

EXCLUSIVE TWO-PIECE CONSTRUCTION (magnet separate from drill press) and tool caddy for easier, safer handling. Caddy keeps tool in one place—ready for the job. Unit placed in position with minimum exertion.



MAIL TODAY FOR FREE DEMONSTRATION

The BLACK & DECKER MFG. CO., Dept. 2010, Towson 4, Md.

☐ Please arrange a demonstration of the new B&D Magnetic Drill Press.

☐ Please send me additional information.

Name..... Title.....

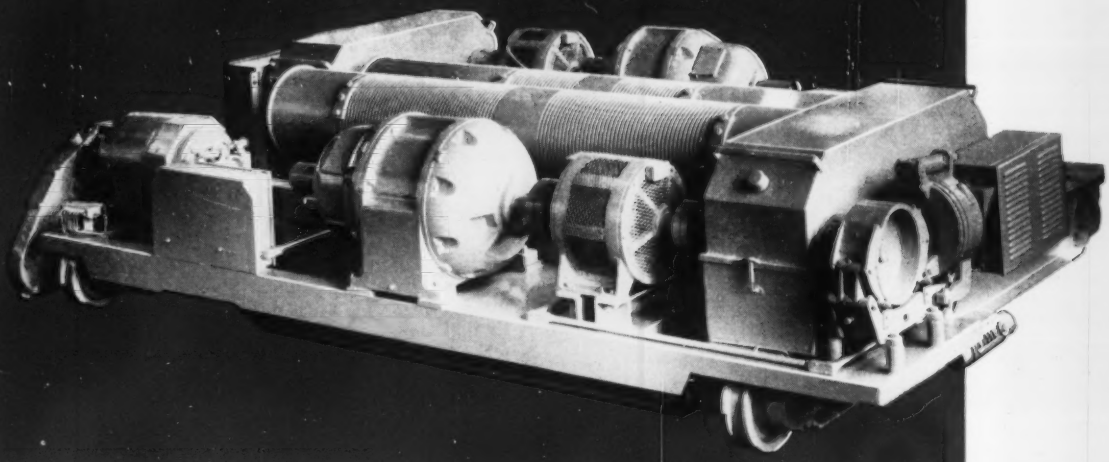
Company.....

Address.....

City..... Zone.... State.....

For Northern Cranes

EZOMATIC
CRANE CONTROL



EZOMATIC *is Smooth, Simple, Dependable*

EASIER *to operate*

EASIER *to maintain*

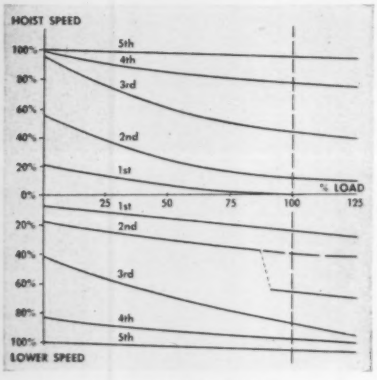
EASIER *to understand*

EASIER *to handle any load*

The new simplified, smooth, accurate control for alternating current hoist motors utilizing full magnetic control combined with an eddy current brake. This improved control arrangement is easier to operate, easier to maintain, makes handling any load easier, safer, more accurate. Regardless of load the speed characteristics both hoisting and lowering are excellent, allowing smooth handling and accurate spotting of any load.

Standard control components familiar to all electrical maintenance and operating men are used throughout. Circuits are simple and readily understandable. No complicated electrical schemes. Used with a standard eddy current brake eliminating mechanical and electrical wear.

Excitation of the eddy current brake is automatically controlled by the motor speed allowing extra smooth acceleration. If fast acceleration is desired it may be obtained by moving the master switch to the last point, thereby eliminating the eddy current brake excitation. Off point braking is provided automatically to assist the motor brake in stopping the load. The motor brake is automatically applied in lowering if the eddy current brake excitation should be interrupted. Speed curves can be readily changed in the field, either up or down by a simple adjustment. When very heavy loads are handled extra lowering speeds are automatically provided.



TYPICAL SPEED CURVES
WITH EZOMATIC CONTROL

For further information write to

NORTHERN ENGINEERING WORKS

210 CHENE STREET • DETROIT 7, MICHIGAN

AT MASSACHUSETTS STEEL TREATING CORPORATION . . .

NEW General Electric Induction Heater Brazes and Hardens up to 3 Tons of Job-lot Parts Every Day

The new General Electric induction heating equipment used at Massachusetts Steel Treating Corporation, Worchester, Massachusetts, quickly won the praise of Mr. Harry E. Boorky, their manager of manufacturing.

FAST, HIGH QUALITY: Says Mr. Boorky, "The unit gives us automatically controlled heating and quenching cycles for treatment of the entire length or of any portion of the piece in only one pass."

BETTER CUSTOMER SERVICE: "In addition, this new G-E heater gives us the advantage of quick-set-up changes required of the high-quality job-lot production we do for our customers.

"Because induction heating can be carefully controlled to the exact point where needed and because it is extremely fast, the parts which we treat are virtually free of troublesome scale—so customers are relieved of many cleaning operations. They also save on press or hammer maintenance and die life is increased."

FOR YOUR APPLICATION: General Electric electronic induction heaters are available in four ratings—7½-, 15-, 25-, and 40-kw, with a choice of four different models in each rating. These four models provide various control combinations, so you can buy the one induction heater which best matches your production pattern from the standpoint of both rating and control. You don't buy wasted capacity.

HEAT TREATING PROBLEMS? Just call your local General Electric Apparatus Sales office, or send the coupon at right.

GET MORE INFORMATION

GENERAL ELECTRIC COMPANY
SECTION 722-7
SCHENECTADY 5, NEW YORK

Please send me a copy of Bulletin GEA-6388.

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COMPANY .....

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CITY ..... STATE .....

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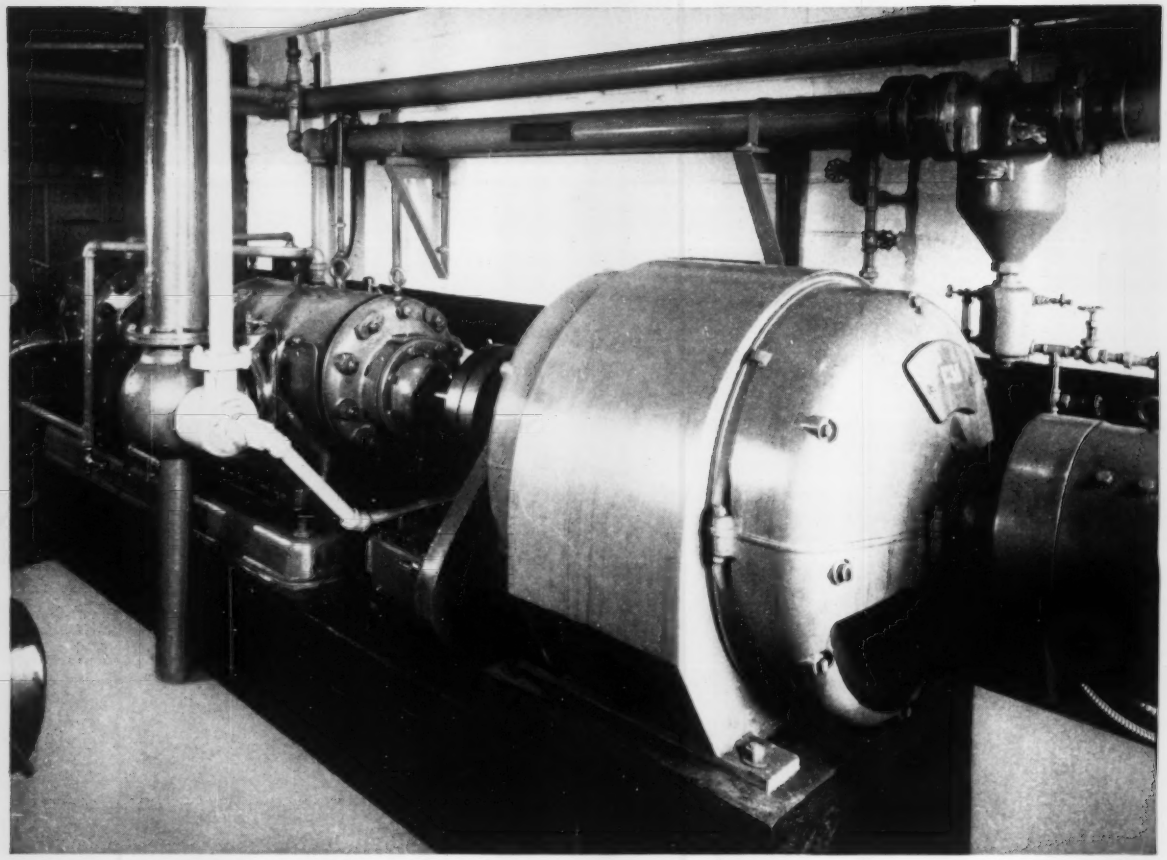

THEY'VE ORDERED FULLER ROTARIES AGAIN AND AGAIN . . .

The proof is the record. Reading Tube Corporation bought its first Fuller Two-Stage Rotary Compressor in 1944—a C50-50H. To meet expanding pneumatic power requirements for increased production, they added a C100-100H Rotary in 1946. Again, the only and obvious choice was Fuller. In 1953, Reading Tube installed its third Fuller Rotary—a C175-175H, and reports continued satisfactory and economical operation, with a bare minimum of maintenance on all three.

Reading Tube Corp. uses Fuller compressors exclusively for such variety of needs as supplying air power in their casting shop, mill, draw benches, in testing and packing, as well as for hand accessories such as grinding, polishing, drilling, etc.

Check these advantages when your plant needs reliable air power . . . . they've made Fuller the choice, time and time again.

. . . full capacity for life of the machine

. . . smooth air flow

. . . sustained performance for top capacities up to 3300 c.f.m. and pressures to 125 pounds

. . . compactness and ease of installation, requires minimum space and light foundation

. . . vibrationless due to absence of reciprocating parts.

To get all the facts, write today for Bulletin C-5A.

C-310
3894

FULLER COMPANY
GENERAL AMERICA
TRADE MARK

FULLER COMPANY
160 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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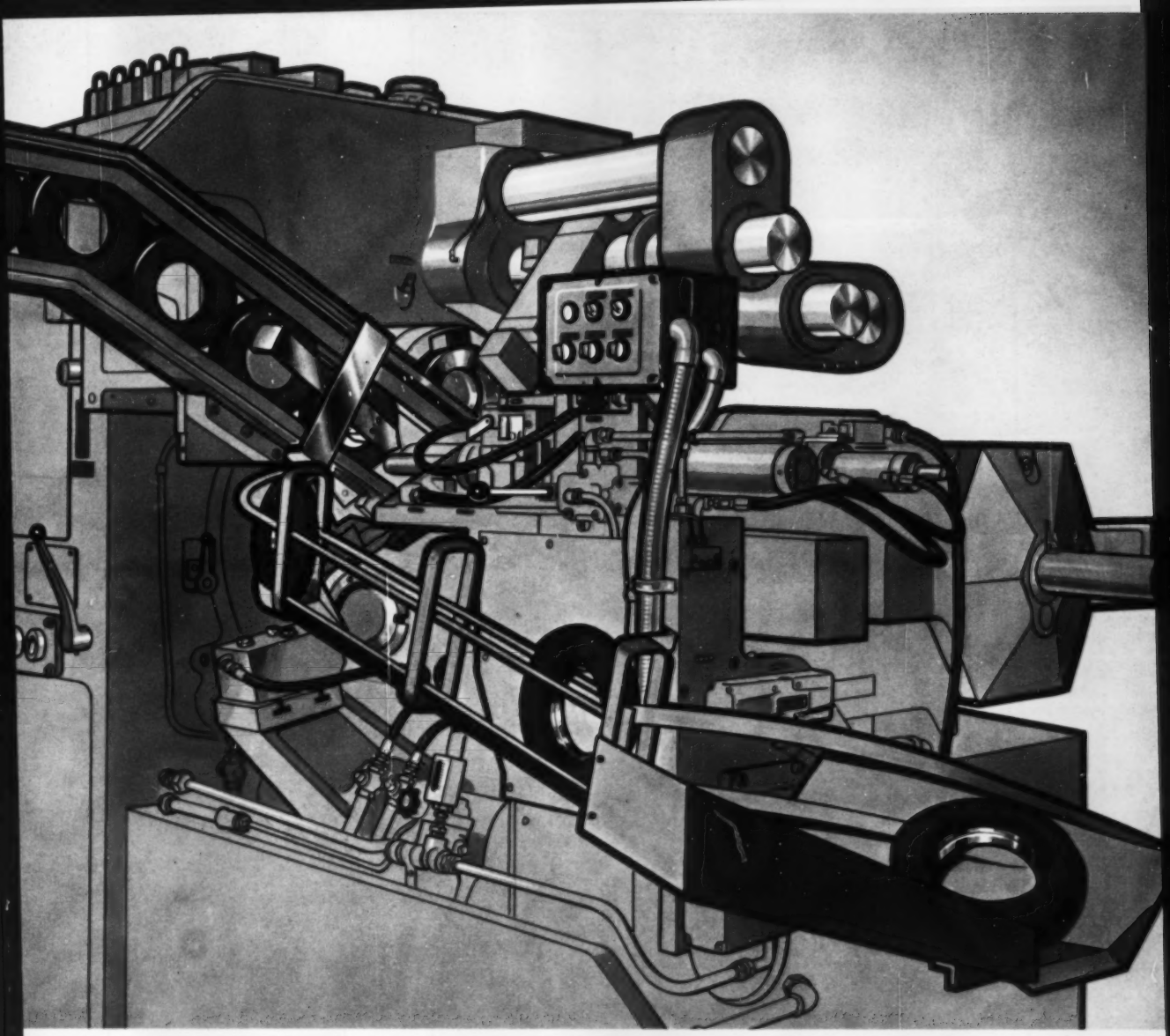
Fuller

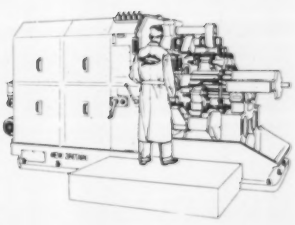
PIONEERS OF HIGH-EFFICIENCY VANE TYPE ROTARY COMPRESSORS SINCE 1930



get more chucker work done

with automatic "handling"

New Britain chuckers are the time-tested leaders in their field. Their basic open-end design, an exclusive New Britain feature, makes them unusually well adapted to the automatic handling of pieces. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.



Automatic Chucking Machine

1-minute tool change gets more

contour work done

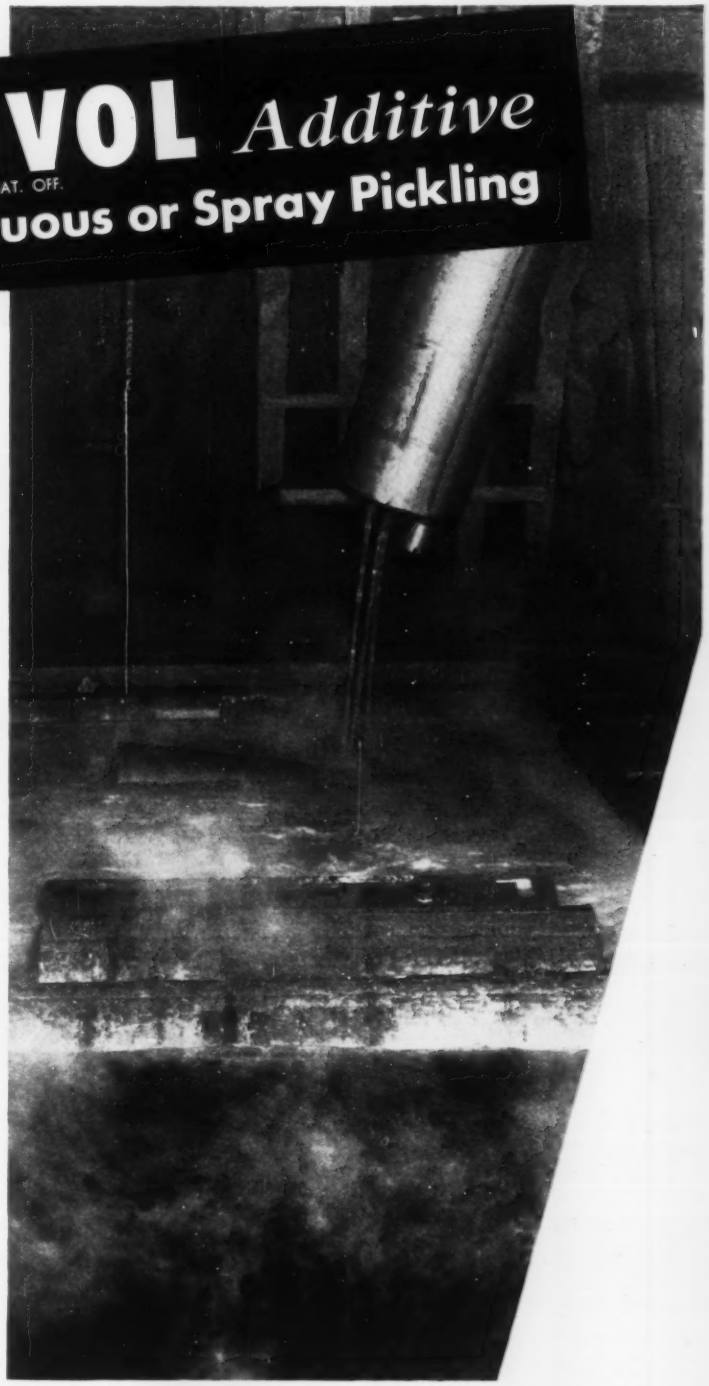
It's a fact — you can do more work in a day with a New Britain +GF+ copying lathe and a single-point tool, than with a conventional lathe using half a dozen. Just slip out the worn tool, slip in a new one, gauge it to a single dimension and you're ready to go again. The template repeats the dimensions. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

New Britain +GF+ Copying Lathe

Use ACTIVOL *Additive*

REG. U.S. PAT. OFF.

in Batch, Continuous or Spray Pickling



- **Saves Acid**
- **Saves Steel**
- **Lowers Pickling Cost**
- **Reduces Fumes**
- **Provides Cleaner Metal**

Put ACTIVOL in your pickling process and get the eight important benefits only this original chemical provides:

1. accelerates—delays or maintains at present rate pickling of metal in acid baths
2. controls scale removal with minimum action by the acid on base metal
3. reduces hydrogen embrittlement
4. removes oil and mill grease
5. speeds cleaning and pickling cycles
6. reduces amount of acid required
7. eliminates fume formation
8. costs less per ton of metal processed

ACTIVOL is available in numerous liquid or powdered grades offering various degrees of detergency, wetting out properties, foaming and non-foaming characteristics. All grades mix, in a clear solution, with all mineral or organic acids. They are not black coal tar derivatives.

Write, wire or call and get full details on popular ACTIVOL additives.

HARRY MILLER CORP. HAMICO 4th & BRISTOL STREETS PHILADELPHIA 40, PA

manufacturers of STEELGARD, IMMUNOL, HAMIKLEER

HARRY MILLER CORP.

Original Products and Processes Since 1936

4th and BRISTOL STS., PHILA. 40, PA.

DAvenport 4-4000 *Service Representatives in Principal Cities*

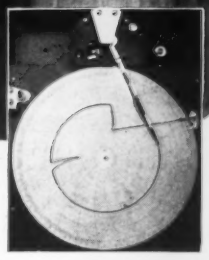
DESPATCH

Aluminum Aging Oven Treats 44 ft. Aluminum Extrusions– Maintains ± 10° F. Thru Load

3 Separate Heating Zones *Plus* DESPATCH High Volume *Air Flow Engineering* Guarantee Uniformity with 27 Air Changes per minute

A maximum charge of 6000 lbs. of aluminum extrusions is aged to specifications in this huge work area. Production reports are excellent, according to executives of Quality Aluminum Products Company of Coldwater, Michigan.

Here are the engineering reasons why this Despatch furnace can handle such large loads of aluminum extrusions with uniform heat in a large work chamber: Furnace range of 0-600° F., 3 direct low pressure burners, each has capacity of 500,000 BTU's, 3 large, heavy-duty fans handling 15,500 CFM., 3 M. H. controls to assure accuracy. Plus Despatch engineering of heat thru special duct design and balance of heat charge in every square foot of the work chamber walls using the exclusive Despatch parts. This combination can provide uniformity within very close tolerances on heat treating furnaces even for such dense loading conditions as the Quality Aluminum Products Company requires.



RECORDING CONTROL REVEALS *FAST RECOVERY, CLOSE CONTROL SHORT AGING PERIODS*

This M. H. record of heat control illustrates the economy of time in aging aluminum extrusions in the Despatch Furnace. Your attention is called to the rate of recovery after a new charge is inserted. Also note the duration of aging periods. Quality Aluminum and Strong Engineering Inc. of Dearborn, Michigan, who sold and supervised this installation report impressive production economies are possible with this furnace.

Write for Complete Information on Despatch Aluminum Solution Heat-Treating Furnaces and Aging Ovens. Ask for Bulletin No. 81K.

DESPATCH OVEN COMPANY

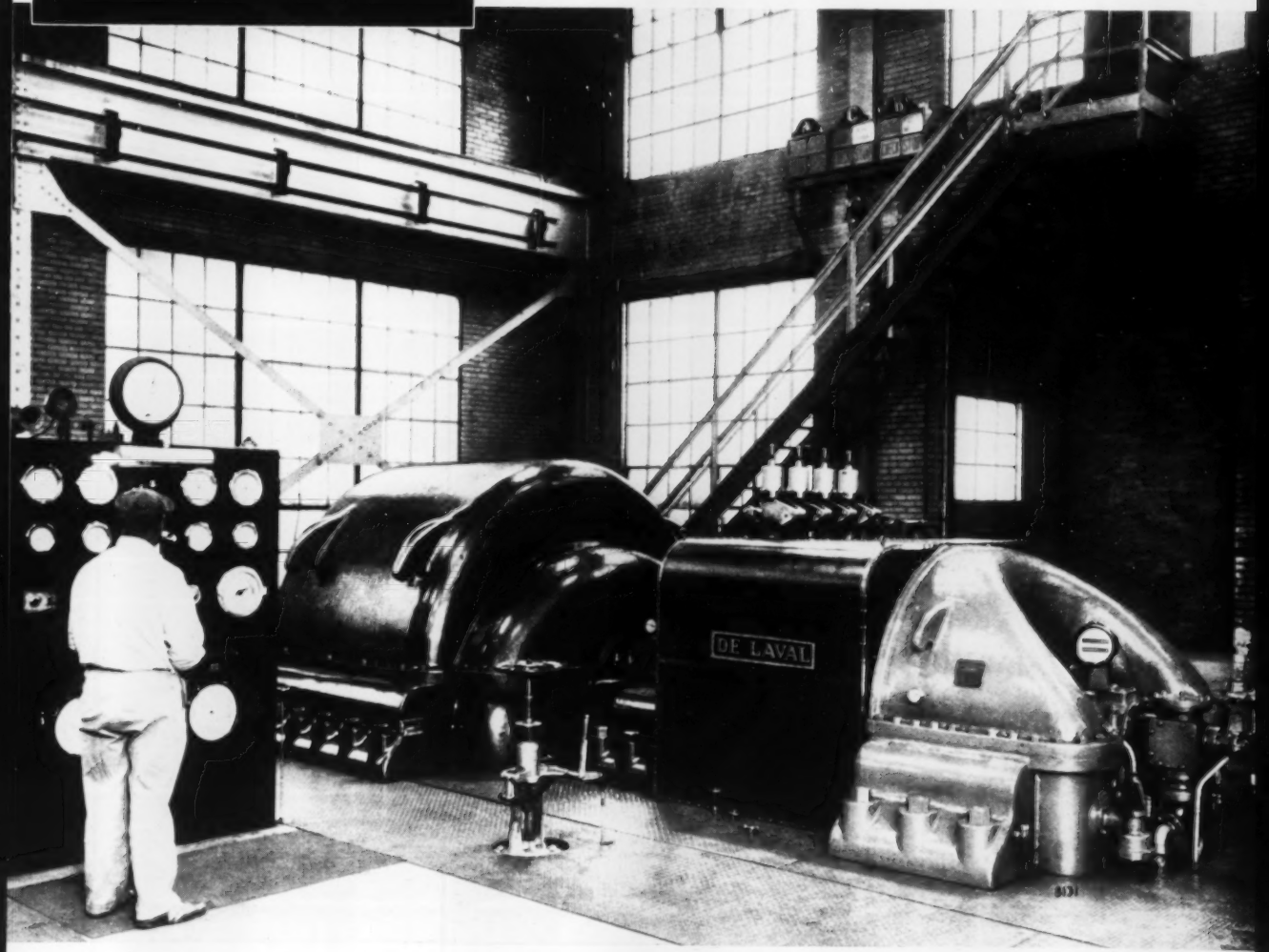
619 S. E. Eighth Street Minneapolis 14, Minn.

Sales and Service in All 26 Principal Cities

PIONEERS IN ENGINEERING HEAT APPLICATION FOR INDUSTRY

DE LAVAL
BLAST FURNACE BLOWERS

give 20 years of service at Great Lakes Steel Corp.



Shown is one of two De Laval centrifugal blast furnace blowers at the Ecorse, Michigan, plant of the Great Lakes Steel Corporation, Division of National Steel Corporation. This 85,000 cfm unit was installed twenty years ago; another 75,000 cfm unit went on the line a year earlier. Both have given dependable round-the-clock service ever since. These turbine-driven blowers are hooked up to a multi-head which enables either one to be used in conjunction with any of the three blast furnaces.

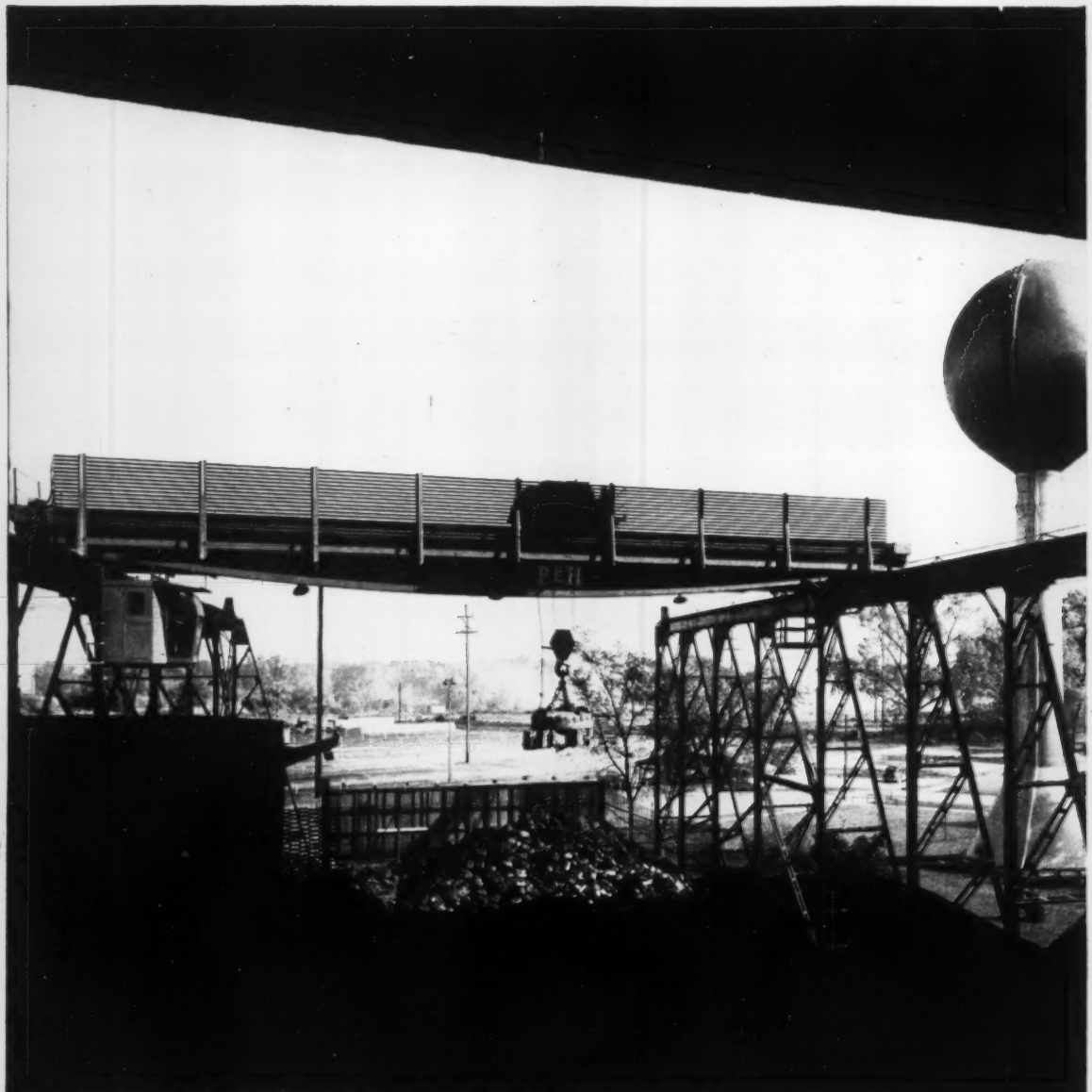
De Laval centrifugal blowers are built in single and multi-stage types to supply air in volumes up to 150,000 cfm for all classes of service in steel, gas and coke plants. The wealth of application experience acquired by De Laval over the years assures a correct and economical solution to your blower problem.

Send for Bulletin 0504

DE LAVAL *Centrifugal Blowers*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

DL-381



CUTS COSTLY SUNDAY MAINTENANCE

Revolutionary P&H development... Electronic "stepless" crane control... eliminates 60% of wearing parts

Maintaining your cranes on Sunday to avoid production-line interruptions during the week is expensive, isn't it? P&H electronic crane control is the answer to that problem.

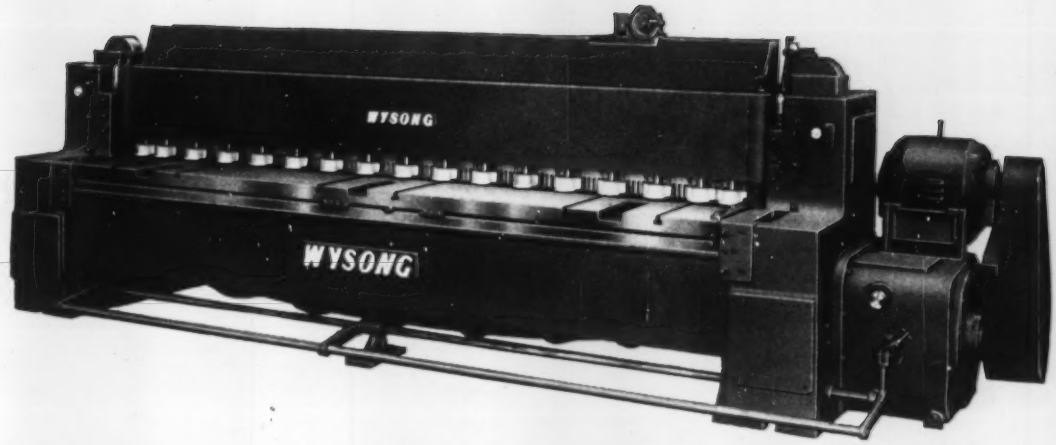
P&H electronic crane control is an outstanding new crane development, exclusive with Harnischfeger, and proved in over 300 installations. It's a simple wiring circuit that eliminates over 60% of the wearing parts found on previous crane controls — the wearing parts that need most frequent replacement.

Electronic control not only reduces maintenance, it furnishes "stepless" control response, making possible infinitely variable—more sensitive—crane operation. What's more, this major improvement can be applied to any existing AC crane.

Make sure your next overhead crane inquiry specifies this revolutionary crane development — P&H Electronic Control. Write Dept. 107E, Harnischfeger Corporation, Milwaukee 46, Wisconsin.

HARNISCHFEGER

P&H ... quality and service for 73 years



Wysong Squaring Shears are

Wysong No. 1225, capacity ¼" mild steel, cutting length 12 feet.

RUGGED to resist shock and pounding

RIGID to maintain accurate alignment

The primary function of Wysong Shears is to give you maximum production with unsurpassed accuracy — day after day, month after month. Their massive hi-tensile castings assure greater resistance to deflection. Their extra large, accurately machined bearing surfaces prevent twists and binds.

Holddowns provide all the power needed for positive clamping of stock — yet, are easily adjusted to prevent marring soft metals or polished sheets.

Ball-bearing, precision back gauges are designed and built to withstand the impact of volume shearing. Easily adjusted to compensate for eventual wear.

Automatic lubrication is standard on larger models — one-shot lubrication on smaller models.

Safety features include totally enclosed clutch and gears, adjustable stationary finger guards, non-repeat unit and treadle lock.

Simplicity of operation and superior design are keys to low maintenance and low down time.

Power models are available with cutting lengths from 48 inches through 12 feet — capacities from 16 gauge through ⅜" mild steel.

For greater accuracy, larger volume, easier operation and the finest in design — Buy a WYSONG . . . It's MILES Ahead!

Buy A Wysong ... It's Miles Ahead

WYSONG

NATIONAL MACHINE TOOL BUILDERS ASSN. MEMBER

Wysong and Miles Company
Greensboro, N. C.

How Exhaustive Tests Guard the High Quality of Stainless Steel at J&L

There is no substitute for quality. And there is no substitute for *testing* to assure the quality of a product. The men, machines and testing devices, in the laboratories at J&L Stainless Steel Division, are as important to the finished product as the men on the ladles, furnace or mill. They are the men who check the steelmaking process each step of the way . . . analyzing it chemically and metallurgically . . . etching it to see if there are internal weaknesses . . . pulling it apart to check its tensile strength . . . subjecting it to shock impact tests at room and sub-zero temperatures . . . determining its ability to harden under thermal treatment . . . checking its hardness . . . magnifying it a thousand times to study its microstructure.

It is here, in the testing laboratory, that science and technology join experience and skill to produce the finest stainless steel available . . . anywhere.

Rush Orders Filled from Ready-to-ship Inventory

Quality, plus the ability to ship a wide range of stock *immediately*, is daily taking our customers "off the spot". A stock of hundreds of tons of finished stainless bars in a variety of grades and sizes is now available. Write for our latest stock lists, or for quotations on bars or billets.

Jones & Laughlin
STEEL CORPORATION
STAINLESS STEEL DIVISION
Box 4606 • Detroit 34, Michigan
FORMERLY ROTARY ELECTRIC STEEL CO.

This metallographic microscope is used to inspect for cleanliness and proper structure.

A Rockwell Hardness Tester is used to measure the hardness of a specimen after heat treatment.

Complete heat treating facilities are available for use in preparing metal samples for testing.

Tensile testing determines ultimate tensile strength, proportional limit, yield strength, elongation and reduction of area.

Magniflux testing determines internal quality.

Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

HERE'S WHY:

FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads, repeated removal and replacement, frequent adjustments will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

We also manufacture precision titanium fasteners. Write for free booklet.

FLEXLOC® LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.

SPS

JENKINTOWN PENNSYLVANIA

NEW GOLDEN BONDERITE for Aluminum

Uniform color means uniform coatings and uniform efficiency

It's the simplest thing in the world to check on the efficiency of a Golden Bonderite installation. Just look at the color of the aluminum as it comes out of the Bonderite machine. The uniform golden coating looks the same—and it is the same—24 hours a day, seven days a week.

Golden Bonderite sets entirely new standards of efficiency and performance as a paint base for aluminum and its alloys. Operated with the Parker "Reactifier," the Golden Bonderite solution can be used indefinitely, ending the costly necessity of dumping the bath at frequent intervals. Normal chemical replenishment keeps the Golden Bonderite solution in continuous balance.

This ease and certainty of achieving uniformly excellent results means real savings for aluminum fabricators.

It guarantees an effective base for paint.

It breaks the finishing line production bottleneck.

It saves money on chemicals.

It saves money on rejected parts and minimizes field calls because of finish failures.

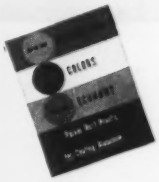
There are no limitations on the use of new Golden Bonderite. It may be applied by spray or immersion. Treatment cycles can be set to suit production speed and equipment.

Samples of Golden Bonderite-treated aluminum, plus test data, are available for your inspection. Write or call.

How Parker "Reactifier" Works

In conventional surface treatments of aluminum, work passing through the solution causes a buildup of impurities. As impurities increase, solution efficiency decreases until there's nothing to do but dump the bath and start over.

The Parker "Reactifier" removes these impurities as fast as they are formed in the Golden Bonderite solution. Constant circulation of the Golden Bonderite through the exclusive "Reactifier" means a balanced, efficient solution that can be used indefinitely.



Write for Bulletin in COLOR!

Get your copy of the descriptive bulletin on Golden Bonderite and its companion, Green Bonderite, for aluminum. It's new!

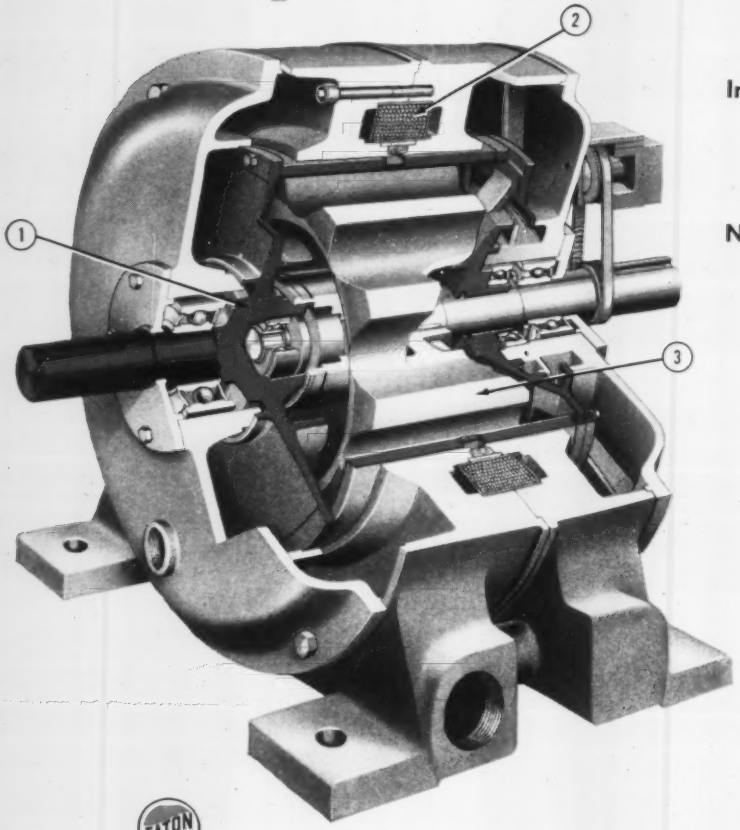
Since 1914—leader in the field

PARKER RUST PROOF COMPANY
2158 E. MILWAUKEE, DETROIT 11, MICHIGAN

BONDERITE	BONDERITE and BONDERLUBE	PARCO COMPOUND	PARCO LUBRITE	TROPICAL
corrosion resistant paint base	aids in cold forming of metals	rust resistant	wear resistant for friction surfaces	heavy duty maintenance paints since 1883

**Bonderite, Bonderlube, Parco, Parco Lubrite, —Reg. U.S. Pat. Off.*

Want Speed Control Like This?



Infinitely adjustable speed from AC power source

★

Wide speed range

★

No commutators, rings, brushes, or rotating coils

★

Instantaneous response

★

Remote control

★

Low power losses

★

Quiet, efficient operation

★

Simple construction

★

Low maintenance cost

1. Input Drum Assembly
2. Stationary Field Assembly
3. Output Rotor Assembly

EATON

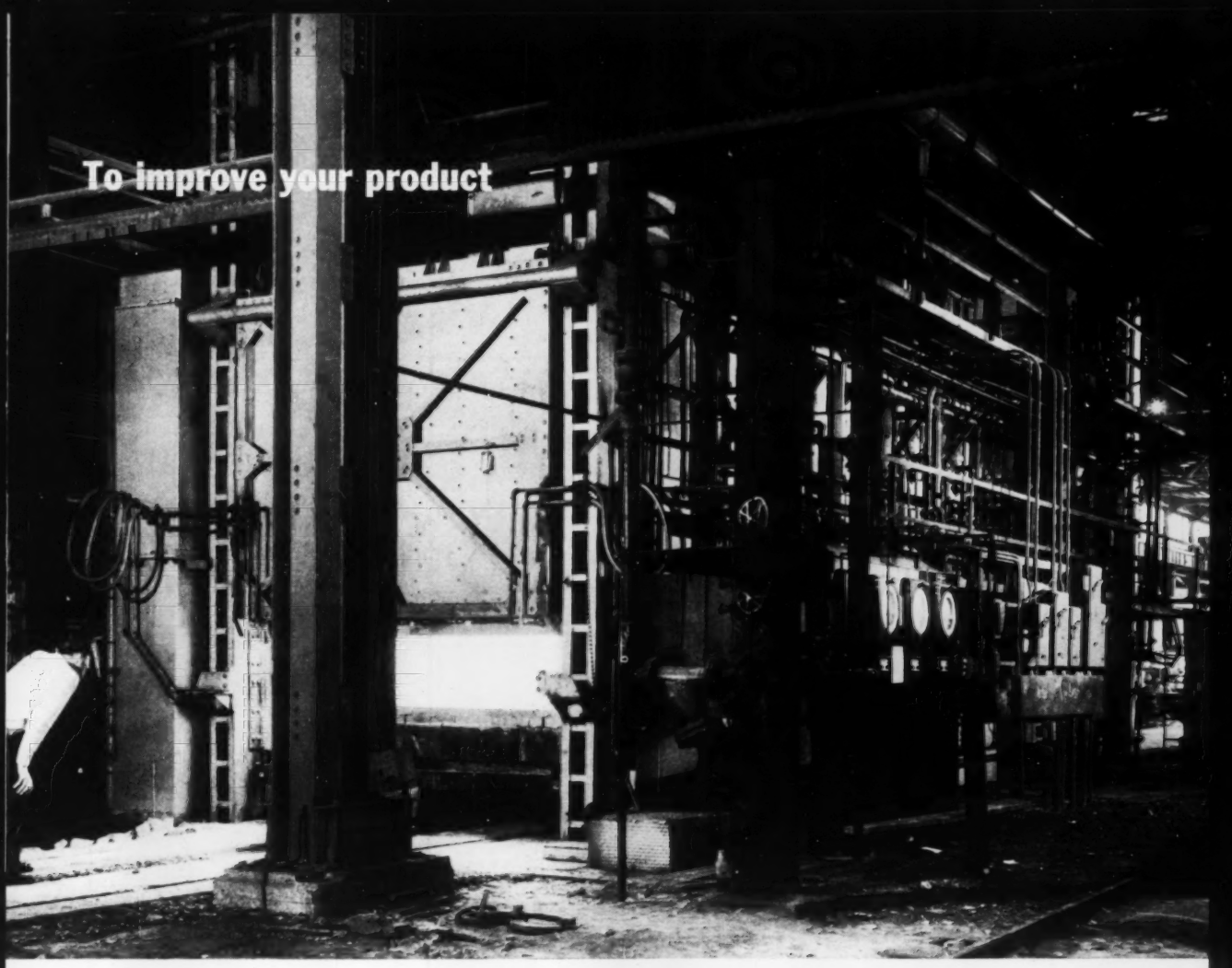
DYNAMATIC®

Eddy-Current Equipment is the Answer!

Dynamatic Eddy-Current Drives, Couplings and Brakes are the solution to difficult speed control problems—in both original equipment and factory installations. Smooth, stepless acceleration and deceleration are achieved without mechanical contact between rotating members. Eddy-current braking provides cushioned, controlled stops. Dynamatic electronic or magnetic amplifier controls, in conjunction with these units, assure wide latitude in operating functions. For efficient, economical speed control, investigate Dynamatic Eddy-Current Equipment.

Send for Illustrated Literature Describing Dynamatic Eddy-Current Equipment

EATON MANUFACTURING COMPANY
DYNAMATIC DIVISION
3307 FOURTEENTH AVENUE • KENOSHA, WISCONSIN



EXACT TEMPERATURE FOR ALCO FORGINGS

New furnaces for ALCO open-die and circular forgings use automatic heat-zone control for better quality of end product

New furnaces are part of ALCO's drive for top quality in open-die and circular forgings. The furnaces, like the car-bottom furnace above, are zoned, and each zone is automatically controlled to the proper heat level. This means that each ingot or billet reaches the forging press at the right temperature for planned reduction, and it also means that ALCO heat treatment is exact and thorough, assuring the best physical properties for the intended application.

Quality and leadership like this are in every step of production of an ALCO forging. They save you money. If you do extensive machining on open-die or circular forgings, Hi-Qua-Led Steel®, which only ALCO offers, can cut your costs up to 50 per cent.

ALCO forgings are available to 40 ft and 30,000 lb in the open-die type, and from 15 to 145 in. OD for circular forgings. For specific information contact the nearest ALCO sales office, or for new full-color brochure write Spring & Forge Division, Dept. OCF-6, P. O. Box 1065, Schenectady 1, New York.

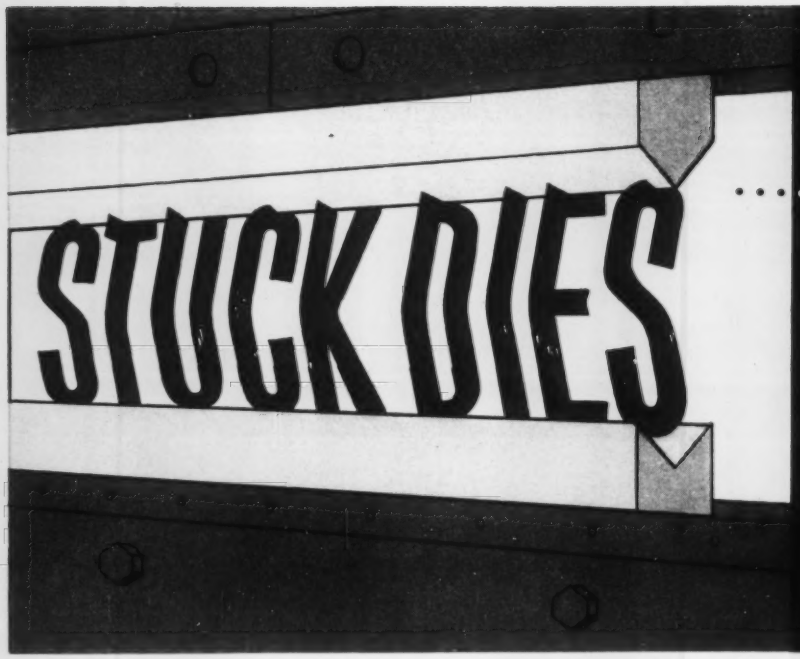
ALCO

ALCO PRODUCTS, INC.

NEW YORK

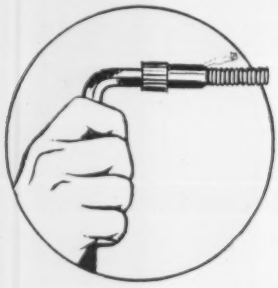
Sales Offices in Principal Cities

Locomotives • Diesel Engines • Nuclear Reactors • Springs • Steel Pipe • Forgings • Oil-Field Equipment



. . . . quickly, easily released with exclusive patented LODGE & SHIPLEY

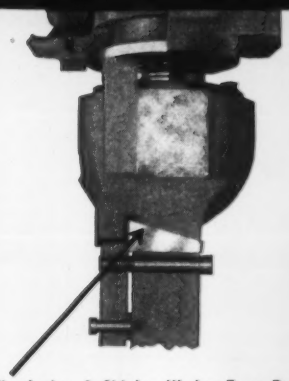
WEDGE TYPE RAM PRESSURE RELEASE



THIS . . .

NOT THIS!

- Use wrench . . . . . not a cutting torch
- in minutes . . . . . instead of hours
- without damage . . . . die holder destroyed

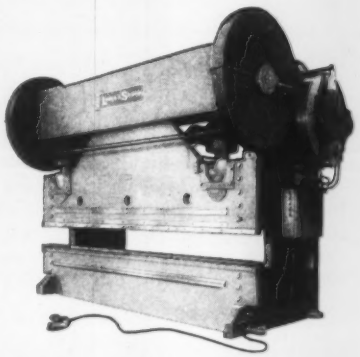


The Lodge & Shipley Wedge Type Ram Pressure Release is unusually simple and rugged in design. A heavy steel wedge has a top angle that complements a similar angle on the base of the ram pittman socket housing. Held securely by a heavy steel plate, the wedges can be released quickly to provide up to ¼" additional clearance.

When a press brake is stalled due to improperly adjusted dies . . . do you face a short delay or near disaster?

With a Lodge & Shipley Press Brake, release of the stuck dies is a quick, simple, non-destructive matter as described in the accompanying detail.

This is but one of many outstanding Lodge & Shipley Press Brake features designed for fast, accurate, efficient and dependable press brake operation. New literature gives complete details. Write: **The Lodge & Shipley Co., 3070 Colerain Ave., Cincinnati 25, Ohio.**



Lodge & Shipley *. . . your Lodge-ical choice*

people buy Scott Wipers for many reasons:

Mr. Orville Barr, Ekco's Chicago Plant Manager, likes soft, absorbent, 2-ply paper Scott Wipers for all clean-up and maintenance wiping. They're Perf-embossed®, a special process which makes them ideal for wiping (1) planers, (2) rolls, (3) punch presses, (4) forming presses, (5) milling machines.

At EKCO, Scott Wipers cut wiping costs 18%

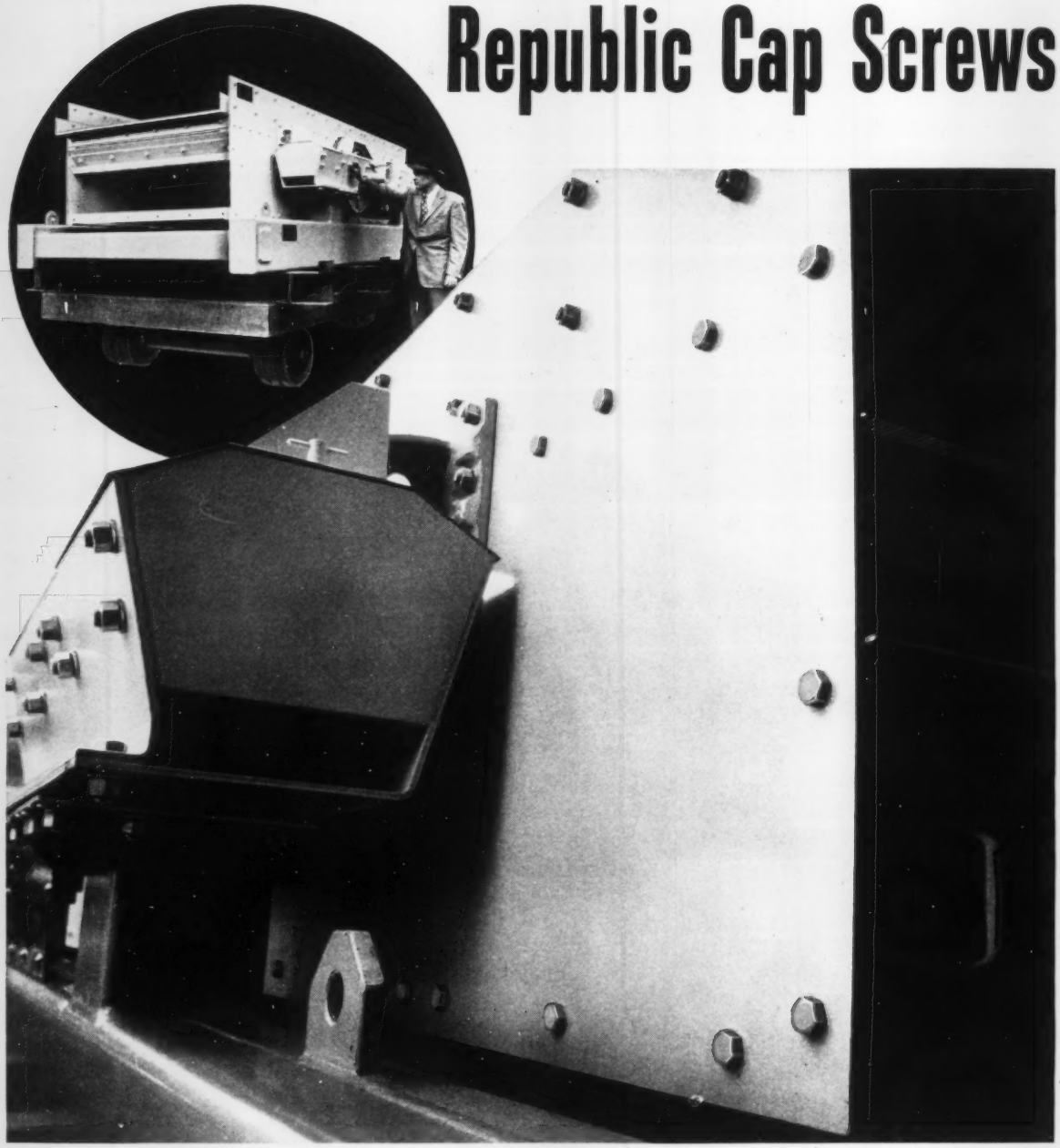
Ekco Products Company's Chicago plant employs 1,400 people making about 1,300 nationally famous kitchen items. Tired of excessive costs with cloth wipers—pilferage, sorting, counting, storing, laundering and dispensing—Ekco switched to Scott Wipers 3 years ago. Besides helping to protect dies valued at $3,000 to $12,000 each, Scott Wipers have saved Ekco 18% to 20% annually in wiping costs.

SCOTT PAPER

For Ekco case history—complete facts and figures—phone your Scott Distributor . . . listed in the Yellow Pages under "Paper Towels." Or write Scott Paper Co., Dept. S-710, Chester, Penna.

Maker of the famous Scott paper products you use in your home.
See "Father Knows Best" and "The Gisele MacKenzie Show" on NBC-TV.

Republic Cap Screws



FINAL ASSEMBLY OF MAJOR COMPONENTS on Ty-Rock Vibrating Screens uses fine-thread cap screws of several different steel analyses, depending on particular application. The W. S. Tyler Company finds this construction distributes loads better and eliminates danger of fatigue failure due to vibration and cyclic loading. Republic Cap Screws have proved more than equal to every requirement.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Protect Shaker Screen Performance

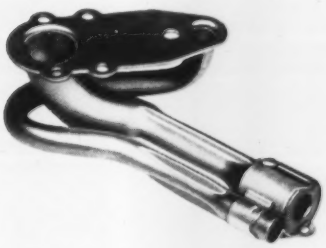
Sorting and sizing ton after ton of jolting, jarring, abrasive material is all in a day's work for Ty-Rock Vibrating Screens, built by The W. S. Tyler Company of Cleveland, Ohio. Satisfactory performance under these brutal conditions requires not only design and manufacturing skill, but a thorough knowledge of materials.

For example, Tyler has studied all types of fasteners and techniques to determine the best method of assembling heavy components. Experience has proved Republic Cap Screws more than a match for this rugged application. The clamping force produced by these strong, precision fasteners withstands both severe vibration and dynamic loading without stretching or danger of fatigue failure. The result is year-in, year-out dependability of Tyler equipment, plus easy replacement of particular parts subject to extreme abrasion.

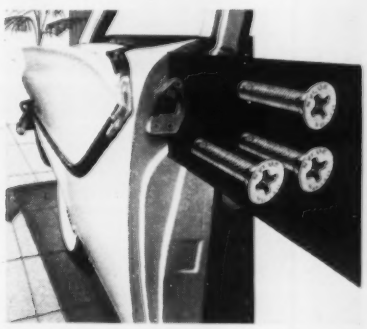
Maximum performance under all operating conditions is typical of Republic's complete line of top-quality cap screws. Types include Hex Head, Flat Head, and Fillister Head in a wide range of sizes. All are available with either coarse or fine threads in high carbon, heat treated steel and low carbon, bright steel—plus many analyses of alloy steel and Enduro® Stainless Steel. All have finished points and full-size bodies.

For complete information on Republic Cap Screws, contact your local Republic office. Or mail coupon for data.

INVENTORY CONTROL PERFORMANCE in this spring manufacturing plant was vastly improved by replacing outdated equipment with these Republic Bar Carrier units. Also, the new system requires only one-quarter as much space. Republic produces a broad line of standard materials handling equipment. Or special types can be provided as needed. Send coupon for details.



OUTSTANDING PERFORMANCE OF ELECTRUNITE® Welded Steel Tubing under a wide variety of fabricating operations is demonstrated by this gas range venturi burner tube assembly. It has been bent, crimped, punched, notched, and welded. Uniform physical and metallurgical properties of ELECTRUNITE withstand this severe forming without rupture or collapse. For full information, send coupon.



PERFORMANCE OF THIS SAFETY DOOR LATCH is protected by Republic Nylok® Bolts. They adjust to permit precise positioning of striker plate. Nylon pellet imbedded in bolt forces tight metal-to-metal lock between opposite threads, whether or not fastener is seated. Striker plate is permanently positioned to assure proper operation. Send coupon for facts.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
DEPT. C-4396
3120 EAST 45TH STREET • CLEVELAND 27, OHIO

Please send further information on:

- ☐ Cap Screws
- ☐ Nylok Bolts
- ☐ ELECTRUNITE Mechanical Tubing
- ☐ Materials Handling Equipment

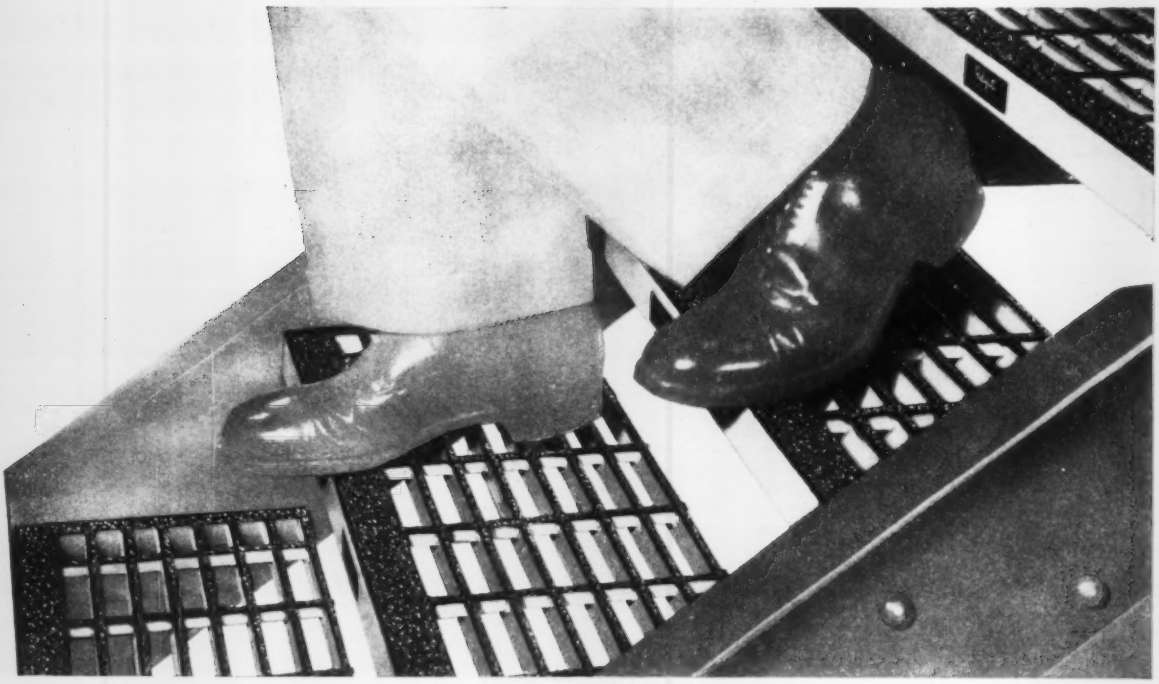
Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

Eliminate slipping accidents!



Relgrit® Abrasive Embedded Grating Treads

Industrial plants throughout the country have found that Relgrit has practically eliminated slipping accidents wherever used.

Relgrit treads are made with an aluminum oxide abrasive, embedded in a "V" groove at the top of the grating bars and nosing. This forms a skid-proof surface that is virtually immune to wear; providing *permanent* protection from slippery surfaces due to water, mud, oil, grease, acids and chemicals. Relgrit is also made for platforms and all other grating areas.

Write for free sample and literature

*You can't slip on Relgrit**

*Patent applied for

Reliance Steel Products Company

P. O. Box 510-L, McKeesport (Pittsburgh District), Pa.

Relgrit Abrasive Gratings and Treads • Lightweight Bridge Flooring
Steel, Stainless and Aluminum Grating • Steel Mill Equipment

NEW GENERAL ELECTRIC DC MOTOR GIVES

Instant Working Power

KINAMATIC* . . . a new standard in industrial direct current motors . . . designed to deliver drive power at the moment you need it!

Split-Second Response . . . larger air gaps reduce electrical time constants . . . smaller armature diameter permits more rapid delivery of torque to load . . . means faster starts, stops, reversals.

Low Inertia Armature is dynamically balanced, banded with steel and glass . . . gives dependable, high-speed operation . . . skewed armature slots minimize torque pulsation, permit smooth machine operation at low speed.

Other Power Packed Features of new d-c Kinamatic motors help give you more continuous, more automatic production . . . economically.

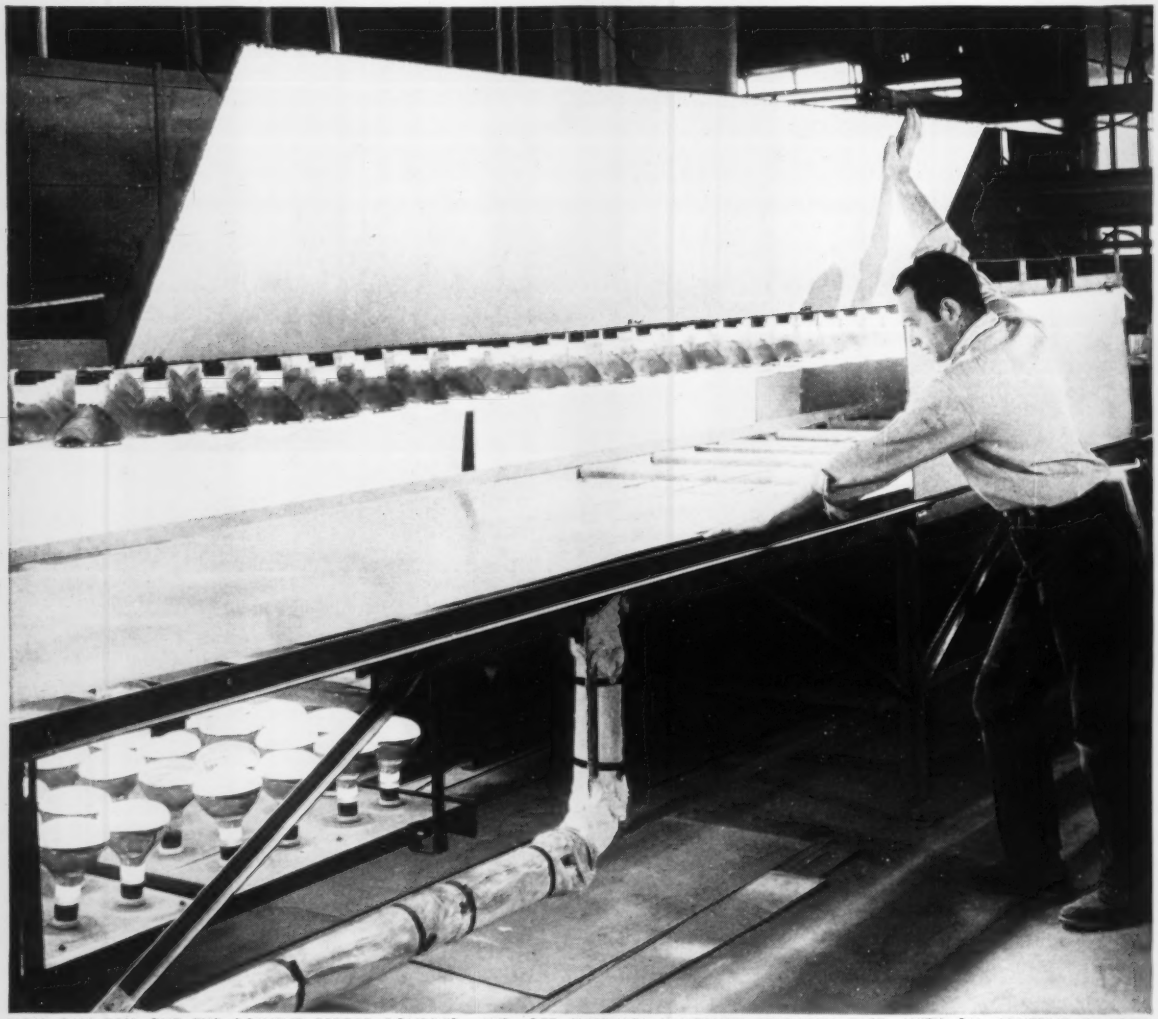
Additional information is available at your nearest General Electric Apparatus Sales Office. Or, if you prefer, write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, Erie, Pennsylvania.* 813-9

*Trade-Mark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

Speed high-strength sandwich bonding by predrying 3M adhesive EC-1357



YOU CAN DRY OUT THE SOLVENT BEFORE BONDING—AND GET MAXIMUM IMMEDIATE STRENGTH FAST—WITH 3M ADHESIVE EC-1357.

Here's new speed in making light, rugged sandwich panels for non-load-bearing uses!

It's EC-1357. This specially formulated, fast adhesive from the laboratories of 3M gives you high bond strength *immediately!* With infrared ovens, you can dry the solvent out of EC-1357 before bonding. Heat absorption is fast, due to EC-1357's dark color. You eliminate unnecessary drying and storage time. You need no clamps or heated presses, just cold press or nip roller. What's more, this cold bond continues to cure at room temperatures—gains added strength with age.

On metal or paper honeycomb cores, EC-1357 builds up a fillet for bigger bonding area and strength. Use EC-1357 with glass foam cores, too.

SEE WHAT 3M ADHESIVES CAN DO FOR YOU! Consult 3M Research, contact your 3M Field Engineer or write on your company letterhead for information and free literature to: 3M, Dept. 610, 417 Piquette Ave., Detroit 2, Mich.

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MINNESOTA MINING AND MANUFACTURING COMPANY • ADHESIVES AND COATINGS DIVISION

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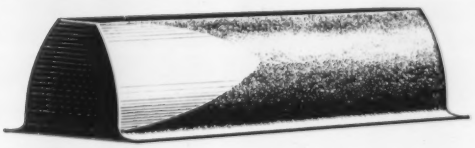
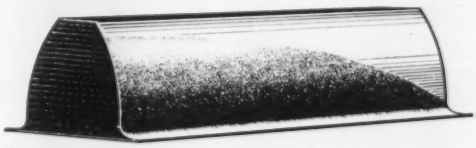
Hard Gear Honing

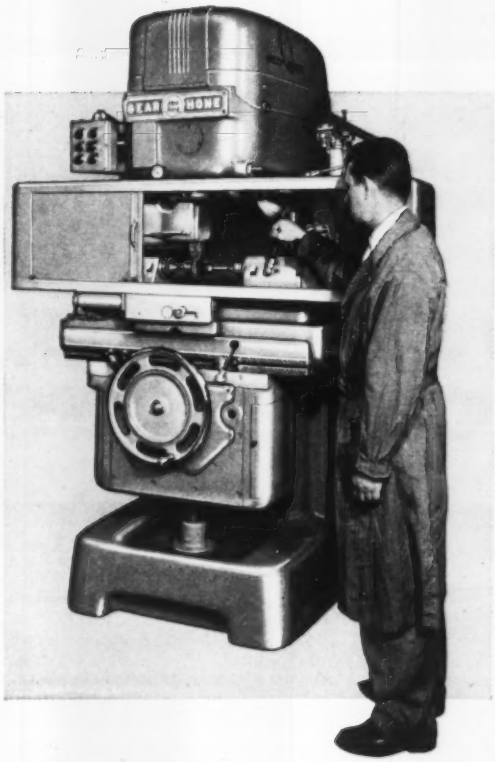
GIVES YOU BETTER GEARS AT LESS COST

QUICK GEAR INSPECTION

One quick pass with a Red Ring honing tool cleans up the teeth or immediately reveals heat-treat distortions, thus indicating corrective adjustments in the gear forming processes.

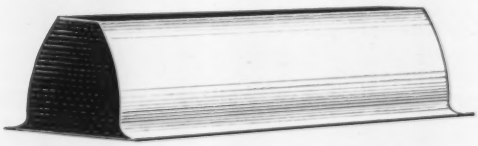






CORRECTION OF HEAT-TREAT DISTORTIONS

Minor distortions in tooth profile, helix, index and runout are corrected in from 15 to 60 seconds of honing time.



IN ADDITION

Gear honing provides:

- The Lowest Cost Remedy for Nicks and "Hickies"
- Improved Tooth Surface Smoothness
- Overall Sound Improvement

For Quality Gear Production, write for Bulletin H57-2 which gives the full story on Red Ring Hard Gear Honing.

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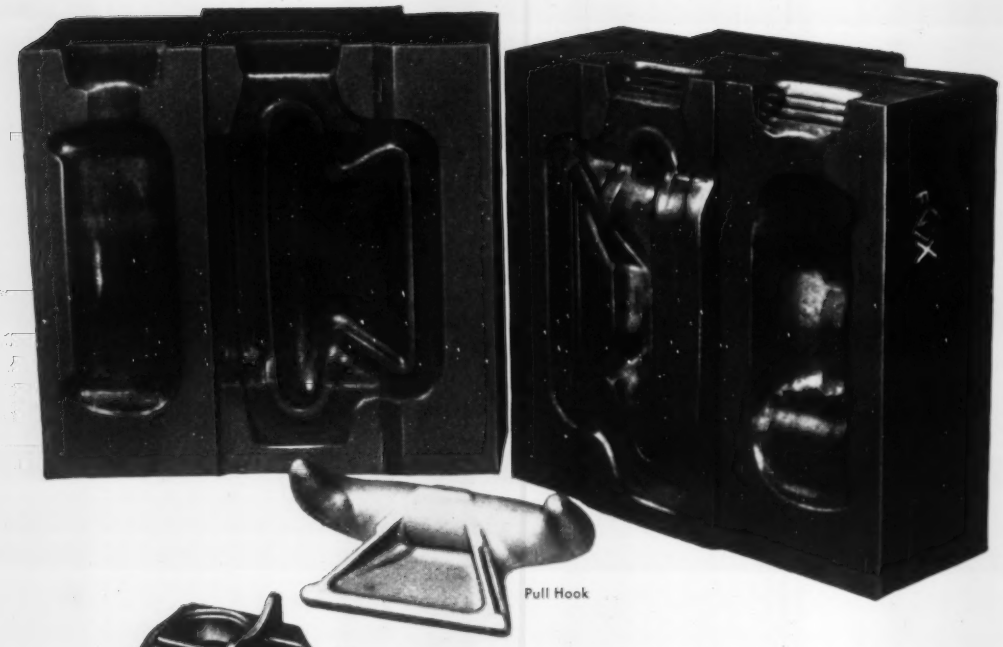
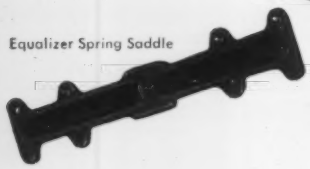


Pull Hook

Pivot Shaft and Bracket

Equalizer Spring Saddle



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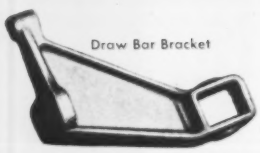
farm equipment manufacturers do!

Track Link

Draw Bar Bracket



International Harvester Company's Tractor Works, for one, uses Finkl die blocks to produce numerous tractor parts such as the pivot shaft bracket, pull hook, track link, equalizer spring saddle, and draw bar bracket shown on this page.

Because of the high volume production of these Crawler Tractor parts, Finkl FX die blocks are used at Harvester's Tractor Works to produce more forgings per sinking, and more sinkings per die. The special machining quality reduces die sinking time, without impairing the heat or wear resistance of the dies in production.

Finkl die blocks are available in several grades, all sizes, and tempers to handle virtually any forging requirement. Call your local Finkl representative next time you are considering die blocks or forgings. He will be glad to help you and there is no obligation.

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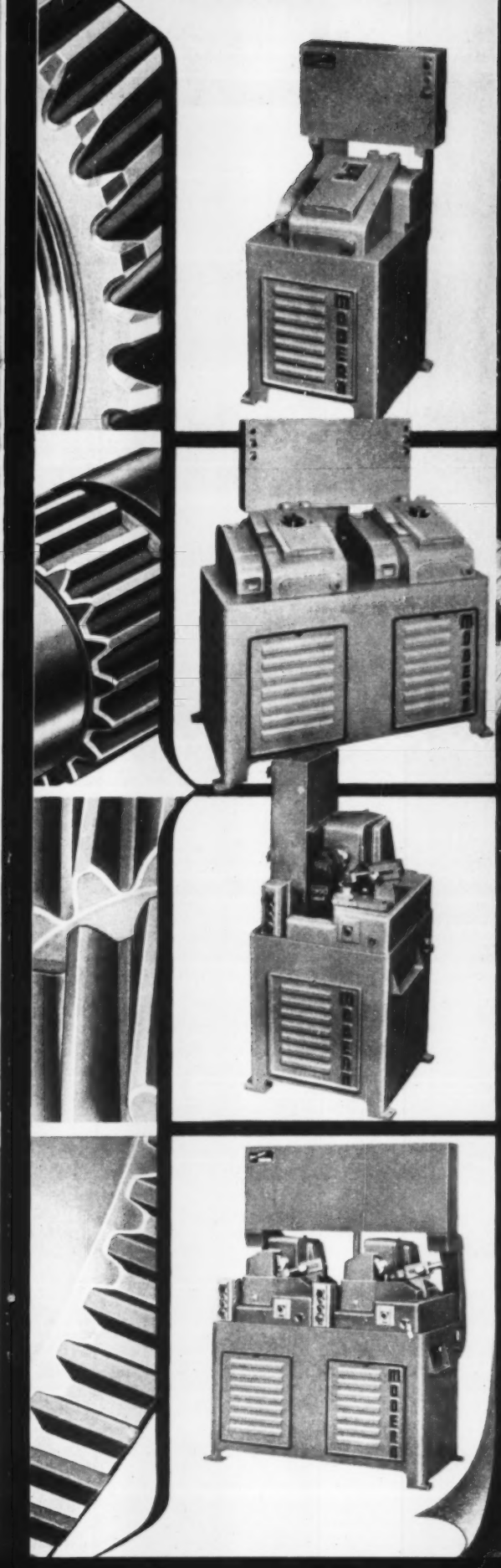

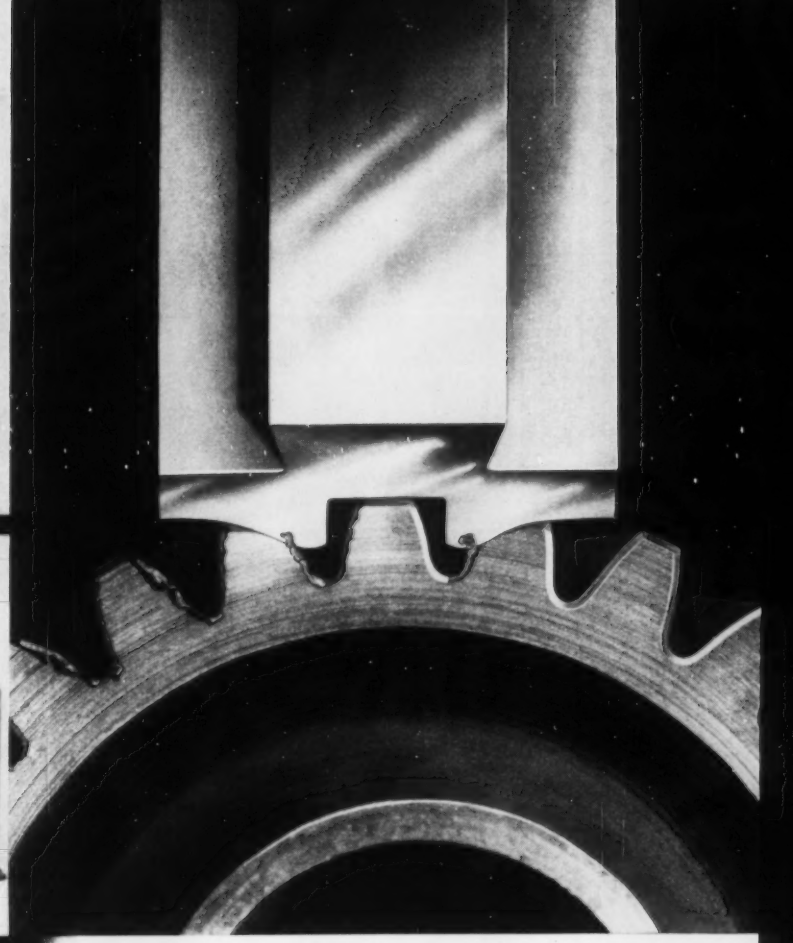

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You know how costly removing burrs can be. **MODERN** can cut those costs for you—drastically and positively. **MODERN** Burr-Masters remove the burrs from all kinds of toothed parts—internal and external gears, splines, sprockets, clutches, etc.—leaving a smooth GENERATED chamfer over the entire contour.

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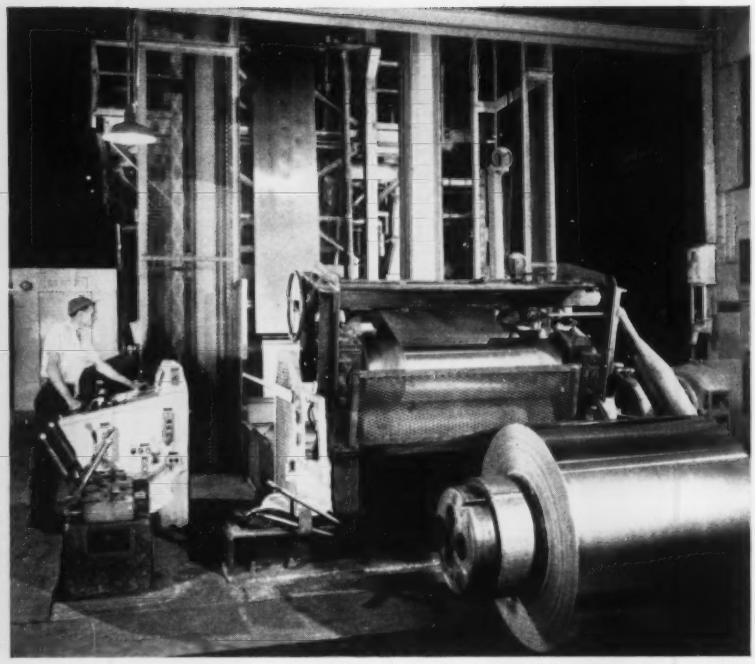
Industrial Engineering Co.



Tin plate continuously bright-annealed in direct gas-fired vertical one-pass Selas furnace.

26 Single-Pass Selas Furnaces Heat-Process Strip Continuously . . . at Production Speeds

Selas combines Gradiation® Heating with process control to handle a variety of mill operations

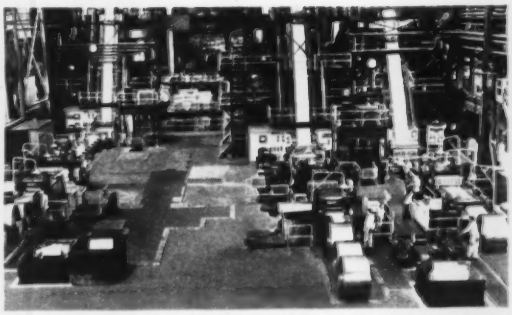
Throughout the nation's metal-producing industry, Selas has pioneered, designed and constructed single-pass strip heat-processing lines for bright annealing of steel . . . annealing stainless steel . . . tin reflow . . . galvanizing-annealing . . . preheat for galvanizing . . . preheat for annealing . . . blueing . . . special coatings . . . brass annealing . . .

In all these operations, radiant gas heat, precisely applied across the strip width, increases heating speed and produces unsurpassed uniformity in product quality.

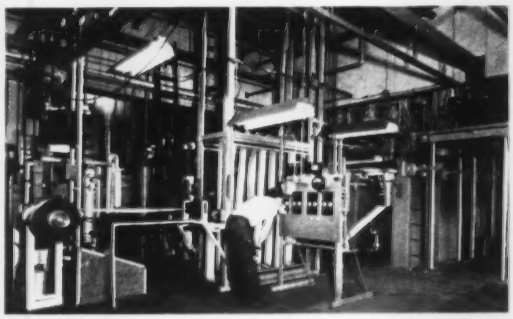
- Compact single-pass design saves valuable floor space . . . avoids rolls in heated section, eliminating accompanying maintenance and product quality difficulties.

- Elimination of externally-prepared atmosphere in heating section reduces operating costs.

- Precise thermal control assures reproducible uniformity, regardless of gauge variations.



Annealing and galvanizing strip 48" wide is a high-speed, single-pass, continuous operation with Selas Gradiation heating.



Control panel governs temperature, strip speed, gas combustion and atmosphere composition in this Selas annealing installation.

Our engineers will be glad to discuss how Selas Gradiation methods can be tailored to your strip heat-processing needs. Address Dept. 211, Selas Corporation of America, Dresher, Pa.

SELAS
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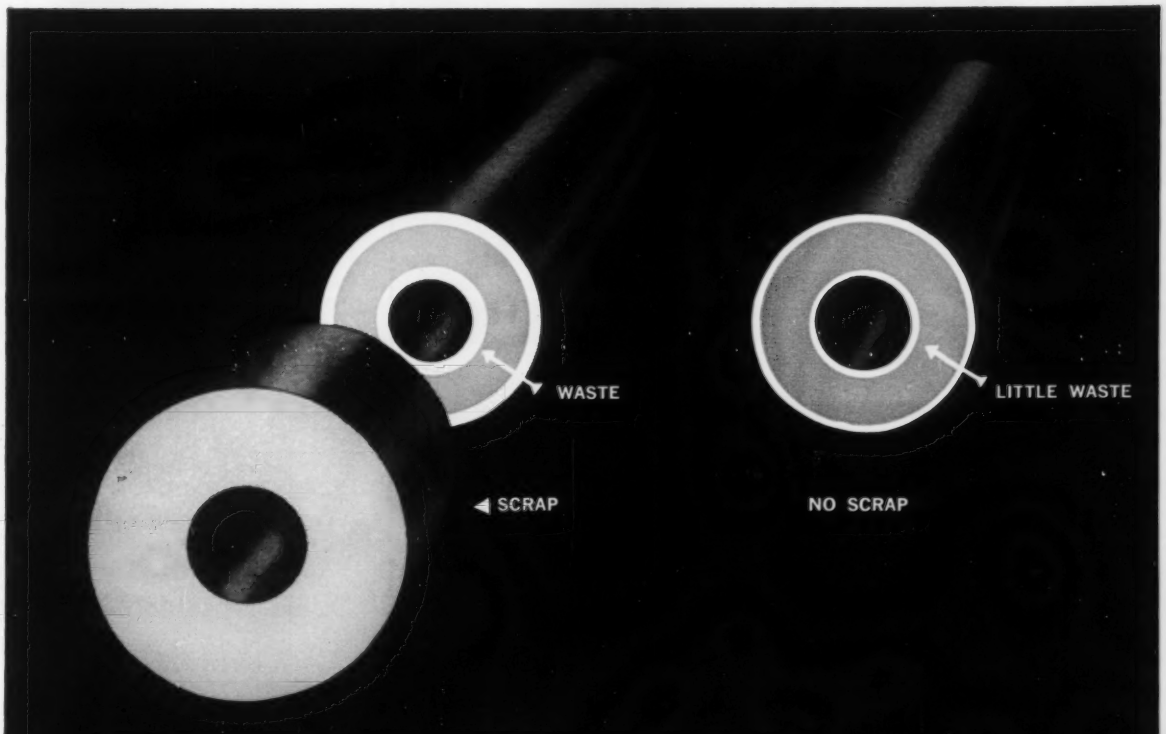
Heat and Fluid Processing Engineers

DEVELOPMENT • DESIGN • CONSTRUCTION



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with Asarcon bearing bronze

1 **Cut short-end scrap up to 48%!** Buy Asarcon 773 (SAE 660) and forget short-end scrap problems created by the standard 13″ bar. You order Asarcon 773 in the **exact** length you need — all the way up to 105″! And you save on handling and inventory costs at the same time.

2 **Save almost ⅓ on diameter losses!** Buy Asarcon 773 and instead of ¼″ clean-up allowances, you have only 1/32″ to 3/32″ to machine. If you're currently using rough-cast bars, you may now be throwing away ⅓ the metal you buy! (Not to mention the waste if you buy solid bars and bore them out!)

3 4 5 **Save these three other ways:** Buy Asarcon 773 and you save on machining time, since there's far less metal to remove. Buy Asarcon 773 and you get better service and longer life from your bearings — there are no blow-holes, pits, shrinks, sand or other foreign matter to cause trouble. Buy Asarcon 773 and you save on down-time — because you get greater yield strength, impact strength and fatigue strength than in the same alloy cast by any other method!

In short, buy Asarcon 773, and watch bearing costs tumble! For more information, talk to your local independent Asarco distributor, who stocks Asarcon 773 in 260 sizes of solids and tubes — or write us directly, and we'll demonstrate how others are saving with Asarcon 773.

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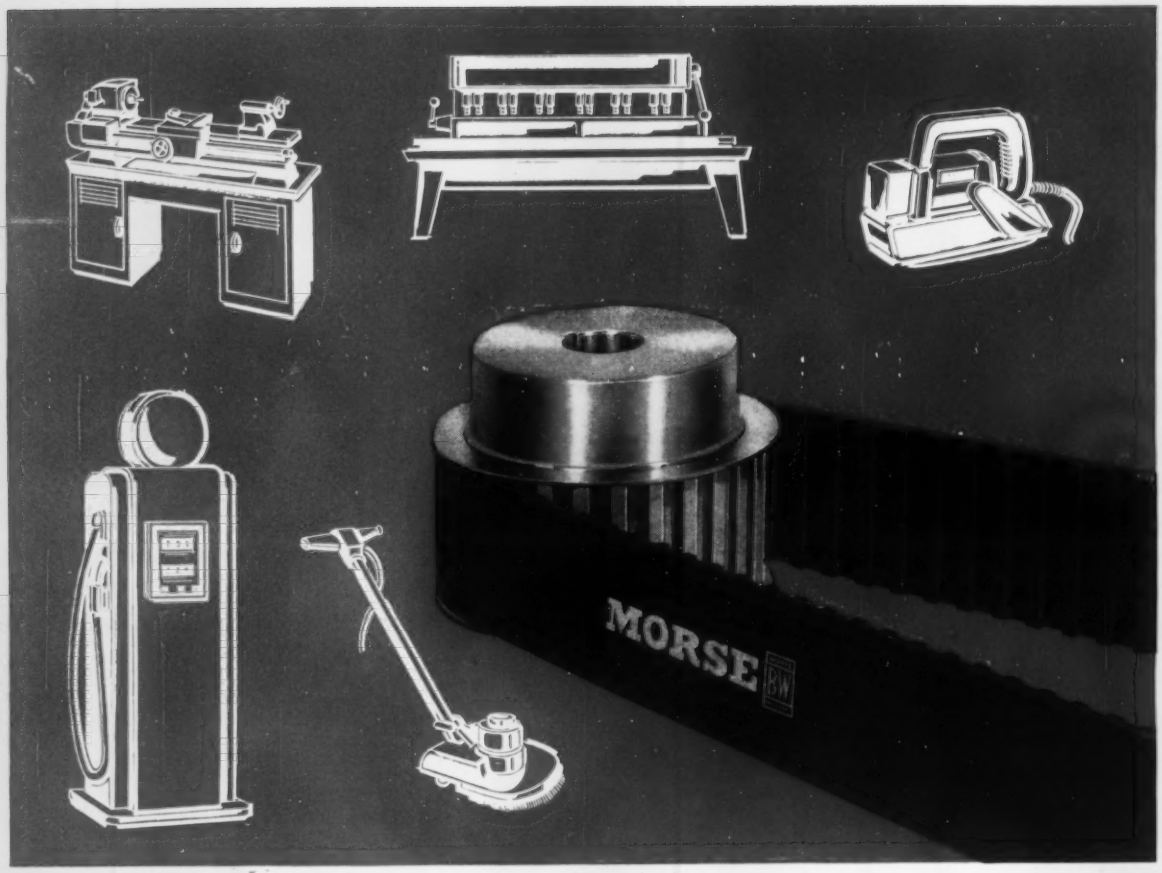

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Morse "Timing"® Belts

Stronger, lighter, slip-proof drives from the longtime leader in power transmission!

EXCLUSIVE!

Only Morse offers all 4 of these basic power transmission drives: Roller Chain, Silent Chain, Hy-Vo Drives, and "Timing" Belts. Your Morse distributor has no ax to grind in favor of one or two types of drives—he gives you a truly impartial analysis of your power transmission problems. Call him today!

Here's why *Morse* "Timing" Belts are important to *you:* For the first time, you can get these versatile, job-proved drives from a specialist with years of experience in every phase of mechanical power transmission!

Along with seasoned engineering know-how, Morse gives you the convenience of a complete line to choose from: 0-16,000 FPM; 1/1000 HP to 1,000 HP; in stock or made-to-order drives.

Whether or not you already use timing belts, it will pay you to get all the facts on *Morse* "Timing" Belts from your local Morse distributor. You'll find him listed in the Yellow Pages under "Power Transmission," or write: *MORSE CHAIN COMPANY, DEPT. 2-107, ITHACA, NEW YORK. Export Sales: Borg-Warner International, Chicago 3, Illinois.*

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THE TOUGH JOBS COME TO

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A trial order will convince you.

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Metalworking Outlook

Buying Power Slips

Factory workers' buying power will go below the 1955 level this fall unless there's an unexpected pickup in the length of the workweek, believes Ewan Clague, commissioner of labor statistics. The index of "real spendable earnings" is at 120.2 (1947-49 = 100), compared with the August, 1956, level of 121.1 (for a worker with three dependents). Commissioner Clague expects the consumer price index to drop later in 1957 but cannot predict how soon. Any drop would have to be big to keep workers' buying power from falling further because no large wage boosts are scheduled for the fall. The latest increase in the consumer index means that 157,000 workers (mostly aircraft) got an escalator increase of 2 or 3 cents on Oct. 1.

Pentagon Cuts Back

Because its spending is rising too rapidly, the Defense Department will cut expenditures by $300 million this quarter. Meaning: Partial payments on contracts will be reduced. Progress payments will be reduced. Payments that are made will probably be slower. One large airframe producer says the effect of this policy will be to force it to borrow $250 million and lay off 20,000 people in this quarter. Defense Secretary Charles Wilson counters by saying industry can borrow enough to tide it over until the Pentagon can get on an even keel in its spending program. Missiles are not affected.

Layoffs in Alabama

Production cutbacks in iron and steel mills and related metalworking plants in the Birmingham district have brought about 5000 layoffs in the area. U. S. Steel Corp.'s Tennessee Coal & Iron Div., the South's largest steelmaker, has laid off about 2000. Most of the other layoffs occur in plants of Republic Steel Corp., U. S. Pipe & Foundry Co., and H. K. Porter Company Inc. divisions.

No New Missile Plant for Chrysler

Chrysler Corp. denies that it will build a $300-million guided missile plant at Huntsville, Ala., either at Redstone Arsenal or near there. The firm has been one of the contractors on the Army's Jupiter and Redstone missiles.

Legal Showdown in Ohio?

A legal showdown is coming to test Ohio laws that prohibit payment of private Supplemental Unemployment Benefits in addition to state jobless pay. Look for steel companies and other firms with SUB in Ohio to follow the Ford-United Auto Worker practice of putting funds in escrow until a court decision is reached (Page 134).

No Industrywide Auto Bargaining

Don't count on industry-wide bargaining in autos next year. George Romney, president of American Motors Corp. and of Automobile Manu-

facturers Association, has shifted his position and now says he favors it. Ford Motor Co. and Chrysler probably want a joint stand against the UAW, too. But General Motors Corp. does not, and the largest automaker holds the key which opens or closes the door on virtually all management maneuvers in bargaining tactics.

Railroad Spending Up, But—

Watch for the railroads to spend about $1.4 billion on capital improvements in 1957. That compares with $1.2 billion spent in 1956. Railroad officials say that even the 1957 outlays are inadequate, that $2 billion annually is needed in capital expenditures for the next decade. They haven't the money, so they want federal help in the form of a Railroad Equipment Agency which would buy the needed equipment, then lease it to the carriers. Congressional reaction has been cool, but railroaders will push harder for it in 1958.

Steel Goes into the Seaway

About 270,000 tons of finished steel products are among the construction materials going into the St. Lawrence project, says American Iron & Steel Institute. The estimate is based on reports by U. S. and Canadian authorities. About 70 per cent of the estimated steel needs is for powerplants. The seaway in the U. S. and Canada together will use about 80,000 tons, while the powerplants for both countries account for the rest.

Atomic Notes

Bethlehem Steel Co. has developed a feasible design for an atomic-powered destroyer . . . Baldwin-Lima-Hamilton Corp. will continue the "feasibility" study it has been conducting on the use of nuclear energy for locomotives and other power sources . . . Development of economical nuclear power is farther off than originally anticipated because of technical problems, says the Atomic Industrial Forum Inc. . . . Westinghouse Electric Corp. is proceeding on its $7-million nuclear materials testing reactor at Waltz Mill, Pa., slated to begin operating in April, 1959.

Straws in the Wind

Makers of titanium mill products now need to set aside only 75 per cent of their production for defense, compared with the former 90 per cent restriction . . . Studebaker-Packard dealers will market the German-built Goggomobile, a pint-size vehicle selling for $1000 to $1400 . . . General Electric Co. is supplying the new electrical equipment for Lukens Steel Co.'s 140-in. plate mill . . . Great Lakes Steel Corp. hopes for labor peace with appointment of Detroit Attorney Gabriel N. Alexander as permanent chairman of all boards of arbitration.

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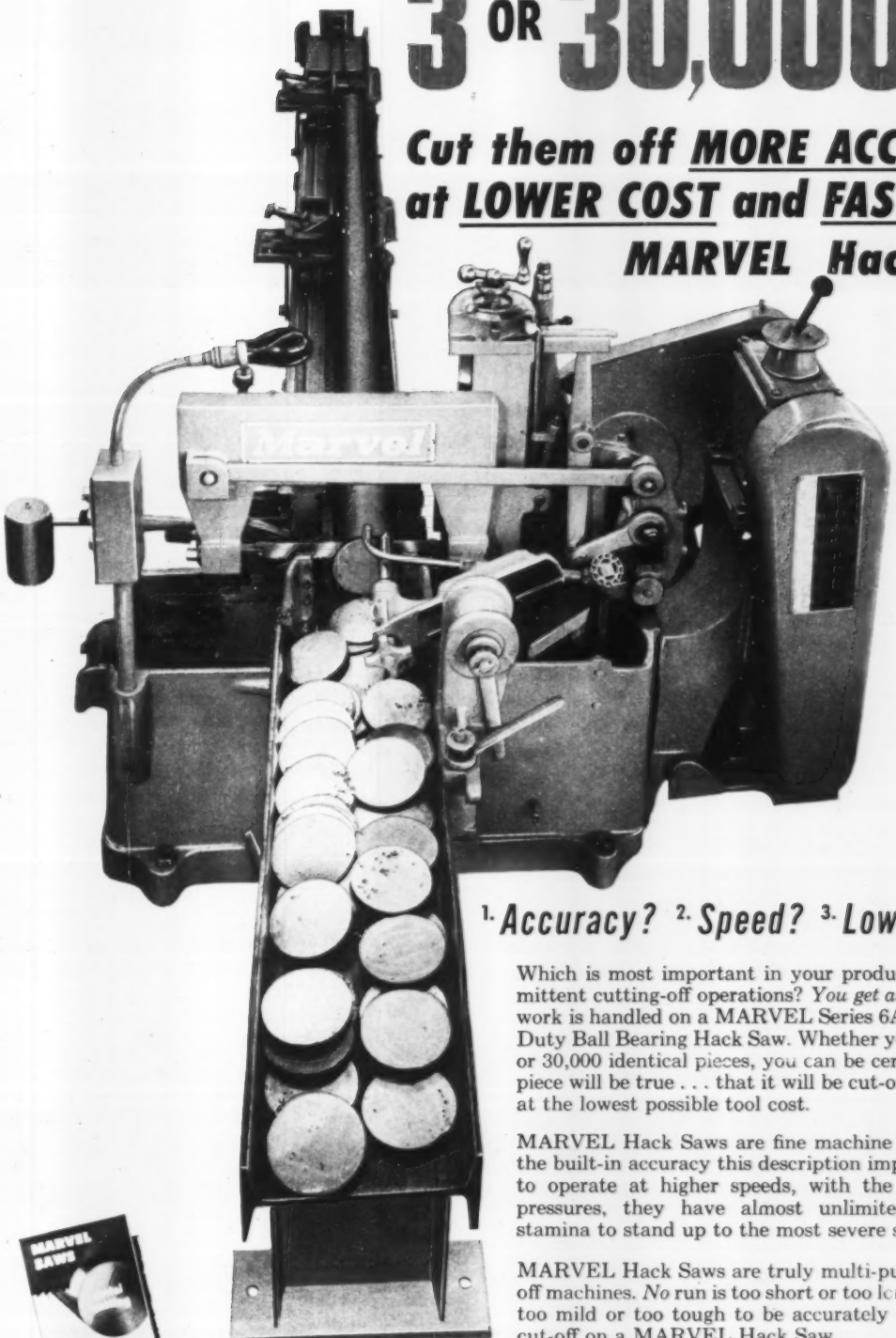

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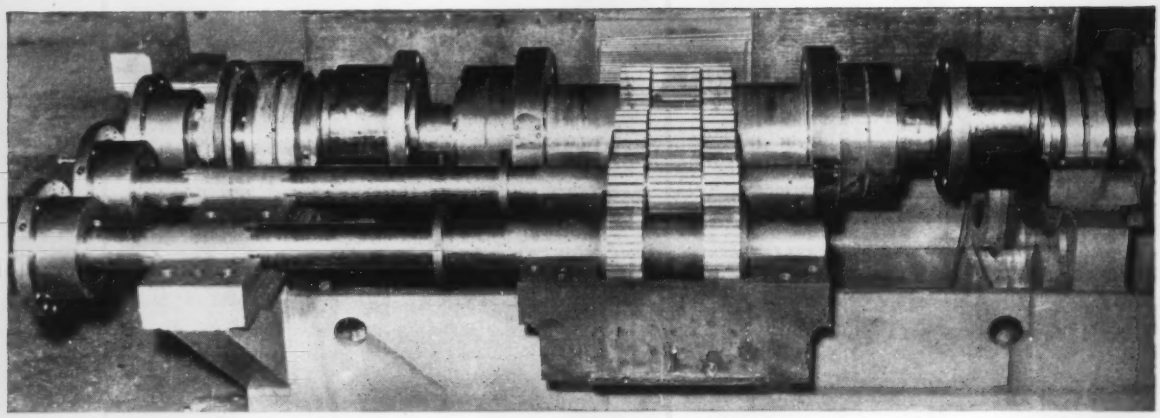


Assembled main shear shaft and front gate drive shaft used in model 541 guillotine flying shear. Shafts range up to 9¼" in diameter and 16' in length. All shafts are fabricated of type 4340 nickel alloy steel.

Giant "flying" shears need...

Nickel alloy steel for fatigue strength and shock resistance in heavy shafting

Cutting metal strip is a shaft breaking job!

It takes enormous blade pressures applied as much as 180 times a minute 250,000 times a day. That's rough on the shafting that activates the shears.

How does The Hallden Machine Company design shafting to take this kind of punishment?

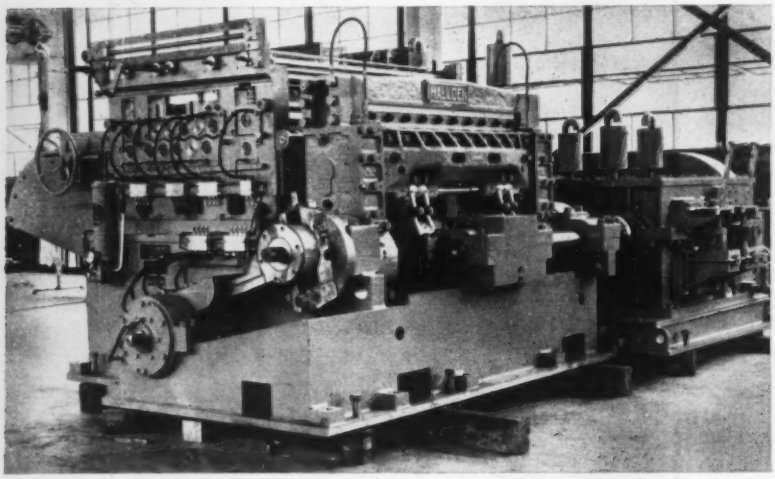
They do it with 4340 nickel-chrome-moly steel.

Some shafts are as large as 9¼ inches in diameter. But even in these heavy sections, 4340's good response to heat treatment provides the toughness and fatigue resistance needed.

For these reasons, type 4340 is now standard for bull . . . main shear and drive box shafting and all other heavy-duty shafting. The extra stamina it delivers pays off for Hallden customers in long, dependable service.

Do you have a difficult or new design problem that demands a material with special properties? If so, you might find exactly what you need in one of the standard grades of nickel alloy steel.

The booklet "The Properties of Heat Treated Wrought Nickel Alloy Steels" helps you choose the right steel for the job. It gives you useful information on the many different nickel alloy steels and describes their range of properties. Heat treatment methods . . . for both carburizing and direct hardening steels . . . is explained in detail. Ask for a copy of this helpful bulletin. We'll be glad to send it to you.



Hallden guillotine flying shear. Nickel-chrome-moly steel, heat treated to a nominal hardness of 260 Brinell and tensile strength of 125,000 pounds per square inch provides the properties needed for heavy-duty shafting in shearing machines. Built by The Hallden Machine Co., Thomaston, Conn.

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Expanding for Efficiency

A reader friend from Chicago visited us last week. We talked about business conditions and prospects. Naturally, we asked about the outlook for his company.

"Well, you know we have completed a 50 per cent expansion over the last two years. If we had not expanded, we could not be producing the volume we are selling today. But in our expanded plant, today's volume kind of rattles around."

We believe our friend's experience is rather typical of the metalworking industry. As a result of the tremendous expansion programs of the last several years, our capacity to produce now exceeds our immediate needs. The basic steel industry next year will have capacity to make 141 million tons of ingots. Production will be nearer 120 million tons. The auto industry could turn out 10 million passenger cars, but expectations for sales are in the 6 million to 6.5 million unit range. Machine tool builders, material handling equipment makers, and other metalworking people face the same problem.

The situation probably will prevail for the next year or so. Perhaps we will not be pushing capacity for any sustained periods until the early 1960s when we will feel the impact of the war babies forming their own families.

What will the temporary excess of capacity do to capital expenditures and plant expansion?

There are two reasons for expansion: 1. To add capacity. 2. To create more efficient capacity by installing equipment that increases output per manhour.

We may not need additional capacity as such for the next couple years.

We will need more efficient capacity. We will have to increase our productivity to make our costs and our prices competitive.

It will require the replacement of economically obsolete equipment with the most productive machines our suppliers have to offer.

We will buy new plant and equipment not to gain capacity but to gain productivity.

At least, that is what our Chicago friend plans to do. Listen:

"Although we are operating at only about 80 per cent of our new capacity, we are finding that the output of the new portion of our plant costs us 15 per cent less than that of the older plant. Much of the equipment in the old plant dates back to the 1940s. We are going to re-equip the older portion of the plant. We think we can cut our costs more than 15 per cent. We have to spend the money for new equipment to keep our costs in line, our prices competitive, and to get a little more than our share of the market. Then, too, we want to be ready for the next big upsurge in demand."

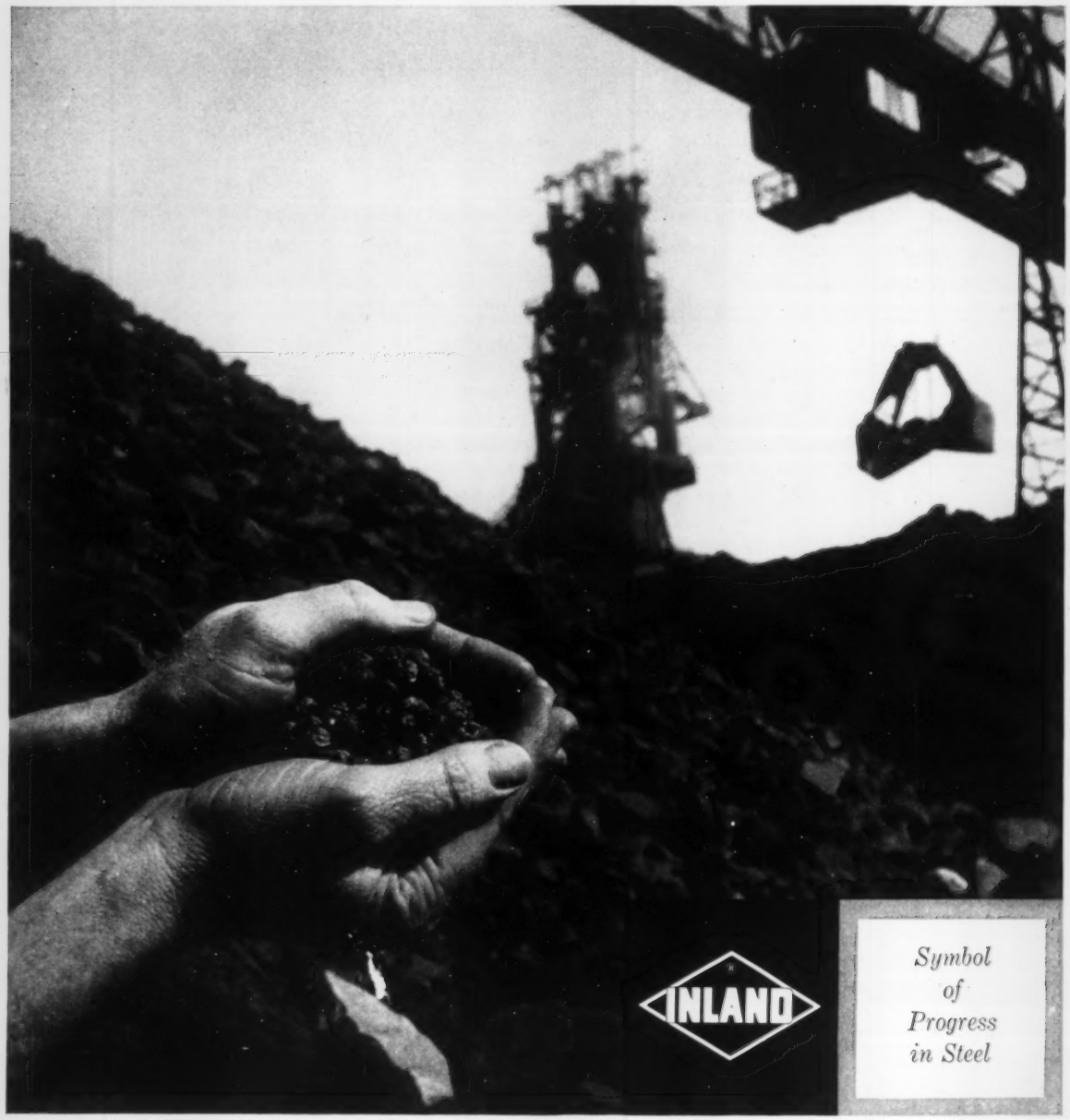
Pretty smart fellow, isn't he?

Walter J Campbell

EDITOR

Steel Seeds

These "seeds" are actually pellets made from jasper iron ore. They're significant because they represent an important new source of iron for Inland furnaces and, hence, for midwestern metalworking. Once considered to be of no metallurgical usefulness because of low iron content, northern Michigan jasper has assumed new value as steelmen have learned to improve on nature through beneficiation processes. These pellets, for example, assay as high as 65% iron. Though iron ore supply may seem remote from your everyday problems, it is in the forefront of Inland's thinking as we plan ahead to serve better the needs of midwestern steel users.



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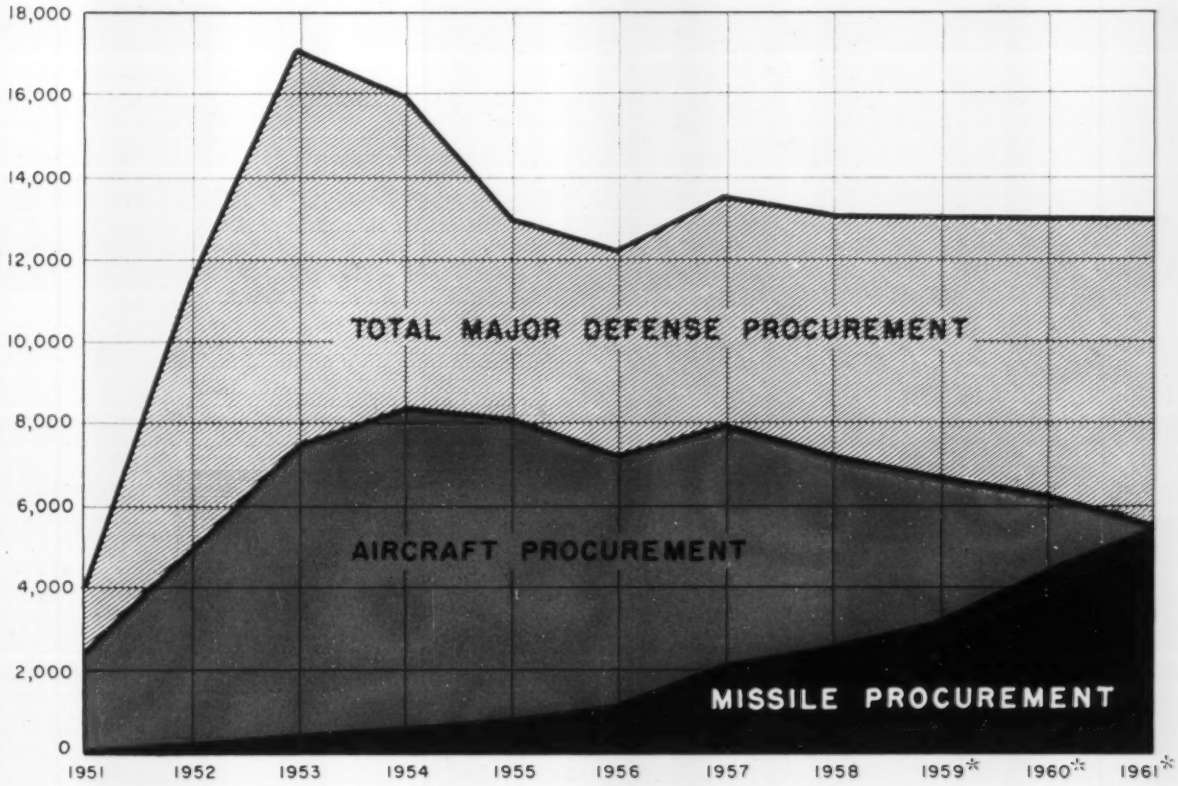
Missiles Pick Up Speed

(In millions of dollars)



1951-1961 are fiscal years.
Source: Aircraft Industries Association of America Inc.
*Estimated by STEEL.

Missiles in Quantity Soon?

THE DOLLARS spent on missile procurement should double by fiscal 1961 (see chart above) if trends developing this year continue. We're getting ready for volume production although as recently as six months ago a top Air Force spokesman described missilemaking as a laboratory job.

The failure of disarmament talks in London, Congressional resistance to higher peacetime Defense Department budgets, and the example of Great Britain's switch to missiles are reasons for our switch (STEEL, July 1, p. 38).

Big Contracts Let — Certainly, many firms no longer think of the missile as a laboratory item: General Electric Co.'s Philadelphia Missile & Ordnance Systems Dept. has a $158-million contract for the nose cones of two AF missiles, the Thor (Intermediate Range Ballistic Missile—IRBM) and the Atlas (Intercontinental Ballistic Missile—ICBM). They and the Navy's Polaris, the Army's Jupiter, and the AF's Titan, must defeat the re-entry problem: They leave the earth's atmosphere during flight, re-enter at speeds which will destroy normal high temperature resistant metals. (See Page 120 for a scoreboard on who makes missiles.)

Unofficial reports indicate the Thor and Jupiter have been successfully test fired. The Atlas was fired just last week. GE's nose cone order indicates we're getting ready for production of an IRBM fairly soon, an ICBM within three years.

Choices Will Be Made—Defense Secretary Charles Wilson is expected to announce this month which IRBM, the Thor or Jupiter, will be chosen for production. Chances are they will not be combined because that would delay production. High Defense officials say a similar choice will be made between the Atlas and the Titan. Secretary Wilson says the Atlas is well ahead of the Titan, and "someone is not going to like what is decided."

The Big Ones Progress—Other indications of progress on the big

Your Missile Scoreboard

Name	Service	Type	Status	Prime Contractor	Other Major Contractors		
					Airframe	Powerplant	Guidance System
Atlas	AF	ICBM	Test fired: test results are classified	Convair Division, General Dynamics Corp., San Diego, Calif.	Convair	North American	Arma Division, American Bosch Arma Corp., Garden City, N. Y.
Bomarc	AF	Long range interceptor (surface to air)	In quantity production	Boeing Airplane Co., Seattle	Boeing	Marquardt Aircraft Co., Van Nuys, Calif. & Aerojet General Corp., Azuza, Calif.	Westinghouse Electric Corp., Pittsburgh
Bullpup	N	Air to surface		Martin Co., Baltimore	Martin		
Corporal	A	Tactical artillery	In use	California Institute of Technology	Firestone Tire & Rubber Co., Akron & Douglas Aircraft Co. Inc., Santa Monica, Calif.	California Institute of Technology	Gilfillan Bros. Inc.
Corvus	N	Air to surface		Temco Aircraft Corp., Dallas, Tex.			
Dart	A	Antitank	In development	Curtiss-Wright Corp., Wood-Ridge, N. J.	Curtiss-Wright	Grand Central Rocket Co., Redlands, Calif.	Curtiss-Wright
Duck	AF	Surface to surface		Fairchild Engine & Airplane Corp., Hagerstown, Md.	Fairchild Engine & Airplane	Fairchild Engine & Airplane	Fairchild Engine & Airplane
Falcon	AF	Air to air	In use	Hughes Aircraft Co., Culver City, Calif.	Hughes	Thiokol Chemical Corp., Trenton, N. J.	Hughes
Goose	AF	Surface to surface		Fairchild Engine & Airplane	Fairchild Engine & Airplane	Fairchild Engine & Airplane	Fairchild Engine & Airplane
Hawk	A	Low altitude antiaircraft	In pilot production	Raytheon Mfg. Co., Waltham, Mass.	Northrop Aircraft Inc., Hawthorne, Calif.	Thiokol	Raytheon
Jupiter	A	IRBM	Successfully test fired	Chrysler Corp., Detroit	Chrysler	North American	Ford Instrument
Lacrosse	A	Tactical artillery	First production announced Aug. 2	Martin	Martin	Thiokol	Martin
Matador	AF	Surface to surface	In use; at least 1000 have been produced; improved version now in production	Martin	Martin	Thiokol & Allison Division, General Motors Corp., Indianapolis, Ind.	Goodyear Aircraft Corp., Akron & Fairchild Camera & Instrument Corp., Syosset, N. Y.
Navaho	AF	Long range (surface to surface)	Cancelled	North American Aviation Inc., Los Angeles			
Nike-Ajax	A	Antiaircraft	In use	Western Electric Co., New York	Douglas	U. S. Army	Western Electric
Nike-Hercules	A	Antiaircraft (to replace the Ajax)	In production	Western Electric	Douglas	U. S. Army	Western Electric
Nike-Zeus	A	Antimissile missile	In development				
Petrel	N	Air to surface (a torpedo)	In use	Fairchild Engine & Airplane	Fairchild Engine & Airplane	Fairchild Engine & Airplane	Fairchild Engine & Airplane
Polaris	N	IRBM (to be launched from submerged submarines)	In development	Lockheed Aircraft Corp., Burbank, Calif.	Lockheed	Aerojet General	General Electric Co., Pittsfield, Mass.
Rascal	AF	Air to surface	In development	Bell Aircraft Corp., Buffalo, N. Y.	Bell	Bell	Bell

ballistic missiles: Burroughs Corp., Detroit, recently exhibited a scale model of the electronic guidance computer for the Atlas. Westinghouse Electric Corp., Pittsburgh, has a $10-million contract to deliver an experimental launching system for the Polaris. Navy spokesmen say this IRBM will be as good as an ICBM when it is launched from a submerged sub close to an enemy's heartland.

The AF has awarded a $38-million contract to AC Spark Plug Div., General Motors Corp., Flint, Mich., for development of an inertial guidance system for the Thor. All told, 17 contractors are at work on the nation's highest priority programs for building the AF's IRBMs and ICBMs.

To fill the gap until the big ones are ready, North American Aviation Corp., Los Angeles, is developing an air to surface missile to be launched from Strategic Air Command (SAC) bombers. Twelve companies bid on this contract, reports the Defense Department. North American received it after its Navaho project was canceled.

Other Production Gains — The smaller missiles are well along. Boeing Airplane Co., Seattle, has a $139-million order for "quantity" production of the Bomarc, a high altitude area defense missile.

Martin Co., Baltimore, recently produced the first Lacrosse missile for the Army. Production should pick up when Martin's $7-million plant at Orlando, Fla. is finished late this year. The company has already built over 1000 Matadors for the AF. That's the record for producing surface to surface units.

The missile has wings made of aluminum honeycombs, which cut

Name	Service	Type	Status	Prime Contractor	Other Major Contractors		
					Airframe	Powerplant	Guidance System
Redstone	A	Long range artillery	In use	Chrysler	Chrysler	North American	Ford Instrument
Regulus I	N	Surface to surface	In use	Chance Vought Aircraft Co., Dallas, Tex.	Chance Vought	Allison & Aerojet General	Chance Vought
Regulus II	N	Surface to surface	In production (successor to Regulus I)	Chance Vought	Chance Vought	GE & Aerojet General	Chance Vought & Sperry Gyroscope
Sidewinder	N	Air to air	In use	Philco Corp., Philadelphia	GE & Philco	U. S. Navy	GE, Philco & Eastman Kodak Co.
Snark	AF	Surface to surface	In production; to be in use early in '58	Northrop	Northrop	Aerojet General & Pratt & Whitney Aircraft, Division of United Aircraft Corp., E. Hartford, Conn.	Northrop
Sparrow I	N	Air to air	In use; planned production nearly complete	Sperry Gyroscope Co., Great Neck, N. Y.	Douglas	Aerojet General	Sperry Gyroscope
Sparrow II	N	Air to air	Experimental only: Not for use	Douglas	Douglas	Bendix	Bendix
Sparrow III	N	Air to air	In production (successor to Sparrow I)	Raytheon	Raytheon	Aerojet General	Raytheon
Talos	N	Antiaircraft	In production; to be in use early in '58	Bendix Aviation Corp., Teterboro, N. J.	McDonnell Aircraft Corp., St. Louis	McDonnell	Bendix
Talos L	N	Antiaircraft		Bendix	McDonnell	McDonnell	Bendix & Radio Corp. of America, New York
Tartar	N	Antiaircraft	In development; contracts awarded for 8 launching destroyers	Convair	Convair	Allegheny Ballistics Laboratory, Cumberland, Md. (operated by Hercules Powder Co.)	Bendix & Philco
Terrier I	N	Antiaircraft	In use	Convair	Convair		
Terrier II	N	Antiaircraft		Convair	Convair		
Thor	AF	IRBM	Successfully test fired	Douglas	Douglas	North American	Arma & AC Spark Plug Division, GM, Flint, Mich.
Titan	AF	ICBM	In development	Martin	Martin	Aerojet General & Reaction Motors Inc., Denville, N. J.	Arma
Triton	N	Surface to surface	Cancelled				
Wizard	AF	Antimissile missile					
Unknown	AF	Air to surface (to be carried by long range bombers)	In development	North American			
Unknown	A	Surface to surface (in ranges between the Redstone & the Jupiter)					

Sources: Aircraft Industries Association of America Inc., Defense department official releases and STEEL.

Editor's Note: Where blanks appear in the table, they represent classified data or data not officially confirmed by Defense department.

costs by one-third and speed production, report Martin engineers.

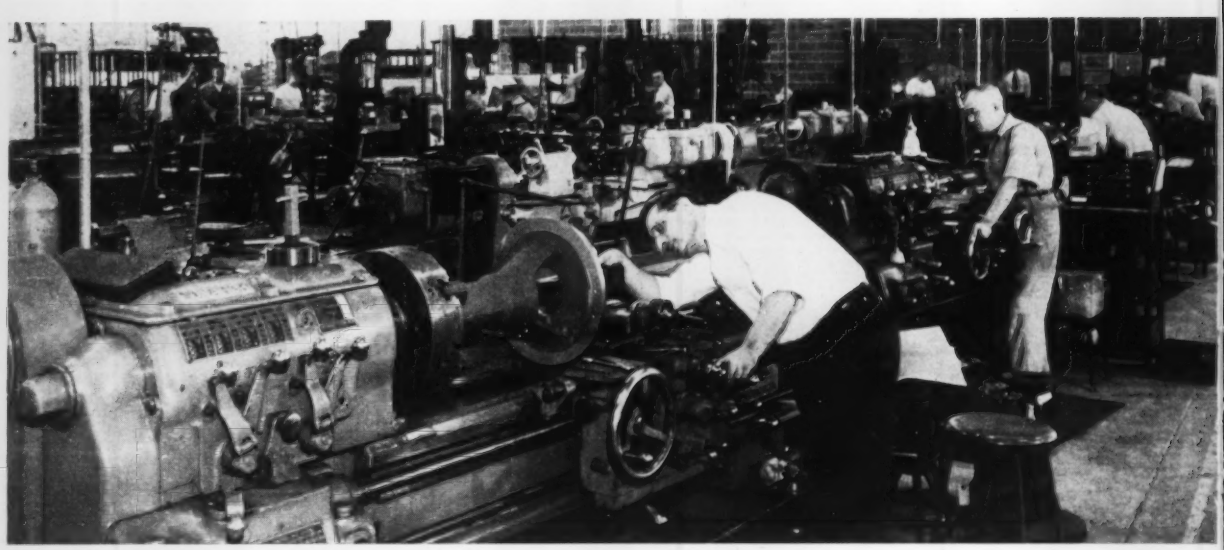
Northrop Aircraft Inc., Hawthorne, Calif., is working on a $73-million order for the Snark for delivery to SAC. Sperry Gyroscope Co., Great Neck, N. Y., has a $47-million contract for Talos guidance systems. Sperry previously had a $52-million contract for Terrier guidance systems. Production of the Talos is "proceeding satisfactorily," says the Navy, at a plant operated by Bendix Aviation Corp. for the Navy in Mishawaka, Ind. Bendix received a $27-million contract early this year. GE has a $5-million order to develop the Talos launching system.

Vitro Laboratories, Silver Spring, Md., a division of Vitro Corp. of America, is doing systems engineering work on the Terrier, Talos, Polaris, and Hawk.

Many smaller missiles already in use by the armed services are being produced at high rates.

Estimates — Secrecy surrounds exactly what we are doing in missiles, but the pace will be quickened —and soon. Assuming a constant Defense budget through fiscal 1961 of about $13 billion for military hardware, it's not hard to guess we'll spend $5.5 billion on missiles that year. The AF has already said at least 50 per cent of its hardware budget is slated for missiles in fiscal 1961. The Navy figures to spend at a rate of 35 to 40 per cent of its annual aeronautical budget in five years. The Army isn't talking, but look for it to increase spending on missiles, too.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*



Air Reduction Sales Co.

More Equipment Hikes Due

The price spiral continues, but the next six months will see fewer increases in metalworking equipment. Customer resistance and competition tighten

EQUIPMENT prices in some categories will continue to climb during the next six months. But look for an over-all pattern of stability. Many equipment firms, like component makers, plan to hold the line for the present (see STEEL, Sept. 30, p. 49).

Reasons: 1. Many have recently put price hikes into effect—they see no need for further adjustments now. 2. Customer resistance is growing in some industries. 3. Competition is stiffening in industries hit with a business falloff.

Companies planning to stabilize their prices admit there's an element of the unknown involved. Some have labor contracts coming due. Others point out they could get caught in a sudden cost-price squeeze. Either factor could boosts prices unexpectedly, they say.

The long-term outlook remains the same though. Manufacturers say any company can absorb only so much extra cost without raising prices (the National Association of Manufacturers reports average profits as a percentage of sales dropped from 4.9 in 1948 to 3.1 in 1956). It's believed prices will continue up as long as costs do, even though there may be periods of relative stability.

Here's an industry-by-industry rundown of the price picture in nine equipment categories:

Electric Cranes—Look for prices to rise 4 to 6 per cent in the next six months. The average manufacturer has hiked his selling price 3 to 5 per cent since the first of the year, but it's reported this move hasn't been enough to keep pace with raw material and labor (most makers are tied to two and three year labor contracts calling for automatic wage boosts).

Some stabilizing factors: 1. Probably the most important is competition which tends to hold down the amount of each price advance. 2. There are increasing reports of customer resistance.

Belt Conveyors—Most companies marked up an average of 5 to 7 per cent this year. Result: There will be sporadic increases during the next six months by manufacturers which haven't adjusted for recent steel and labor boosts, but the industry as a whole will stabilize.

A 15 to 20 pet cent slump in business this year has tightened the competitive situation, forcing manufacturers to absorb more of their added costs. But makers say they see no end to the price spiral. They point out that structurals, sheets, and plates form a major part of conveyor construction—that as long as periodic steel and labor markups continue, some part will have to be passed on.

Lift Trucks — Some manufacturers recently upped prices an average of 5 per cent. Look for a scattering of advances between now and yearend as other makers adjust to this level. Prior to the recent round of revisions, companies had raised quotations 4 to 10 per cent in 1957.

Business in general is better than it was last year, although competition is still keen. It has forced most makers to absorb a substantial part of higher costs. But many industry people believe dwindling profit margins dictate that

Some Equipment To Cost More

	Since 1950, prices have gone up:	In the next six months, look for them to:
Electric cranes	25-45 per cent	go up 4-6 per cent
Belt conveyors	40-55	stabilize
Printing equipment	25-35	go up 5 per cent
Machine tools	25	stabilize
Hydraulic presses	25-50	stabilize
Industrial furnaces	45	stabilize
Welding equipment	25-30	stabilize
Electric generators	30	stabilize

any further absorptions must come only as the result of accelerated productivity, not as the result of competitive pressures.

Outlook: After the current round of revisions, look for stability until next fall.

Printing Equipment—There's no clearcut pattern here. Quite a few makers indicate they won't charge any more during the next six months. Others say they are considering an increase of 3 to 6 per cent. Close to 5 per cent seems to be the best bet.

So far this year companies have boosted prices 2 to 6 per cent. But their costs have gone up even more: Manufacturers complain competition is so heavy they have to absorb a high percentage of cost bumps. The National Printing Equipment Association, New York, says labor has risen 55 per cent and materials 40 per cent since 1950, costs only 35 per cent. One printing press executive says that in the past units often carried prices based on what the maker thought the market would bear, even if it meant a drop in profits. Now the trend is toward pricing the unit on the basis of cost plus a predetermined percentage of profit.

Machine Tools—Builders have shoved up prices an average of 5 to 7 per cent since mid-July. There will be a slight upturn again in the next six months as more manufacturers adjust for summer steel and labor factors, but the trend will be toward stabilization.

A few companies that raised quotations in the late spring and early summer report they will go up again (by 4 to 12 per cent) during 1958's first quarter. Some special machine tool builders, hit with high labor increases recently, see a 4 per cent spurt before yearend.

But competition, aggravated by a slump in sales, is keen in machine tools and makes most manufacturers wary of initiating a price hike. One observer points out the industry has been operating on a low profit margin based on abnormally high sales. As sales recede, profit margins will have to rise, he says. Most companies are looking to increased production efficiency to take up some of this slack. But some believe it won't be possible for the industry to keep absorbing costs indefinitely. Example: A New England manufacturer estimates that since 1950 labor has gone up 55 per cent, materials 30 per cent, and prices only 25 per cent. He says 50 to 60 per cent of the cost bulge is now being absorbed.

Hydraulic Presses—Some firms have boosted quotations this year by 5 to 7 per cent. Others haven't gone up since 1956. The overall trend for the next six months is toward stabilization. Increases will probably come from firms that haven't made an adjustment since last year. Example: One company estimates it will boost prices 4 to 10 per cent to compensate for recent labor and material markups.

Heavy competition is a stabilizing factor, especially for the smaller units. Business has tightened up, making competitive considerations more important than before. One manufacturer says he looks for more price juggling as buyers shop around.

Industrial Furnaces — Manufacturers think prices will remain fairly stable for the next half year. Reason: Most of the industry has already made labor and material adjustments—since January companies have increased prices by 3 to 7 per cent.

Though some firms still absorb a large proportion of labor increases, it's becoming more difficult. As a Chicago firm puts it: "Profit margins are low. Only additional production per manhour can prevent price increases in direct proportion to labor costs. To stay in business with uneconomically low prices means building low quality equipment."

But business is off some for many firms with the result that competition is keener.

Welding Equipment—Continued stability is the outlook for the next six months. Prices haven't gone up since 1956 when most firms hiked quotations 10 per cent.

One factor helping to hold down costs: Primary copper has fallen 13 cents to the 27 cent a pound level in the past year. Some manufacturers say they have pretty much kept pace with steel and labor costs by greater productivity and more efficient operation. But there are scattered reports of falling profits from other firms. They say it's more difficult to absorb additional costs, but because the industry is so competitive, they can't charge more without losing business.

Electric Generators—Watch for stabilization here. Producers say

they have already adjusted for higher material costs (prices have gone up 3 to 6 per cent this year).

Some labor increases are expected around the first part of 1958. This could mean a few companies will raise prices, but the betting is any gain for labor will be absorbed for the time being and passed on in a general 5 per cent increase later in 1958.

One factor affecting the price outlook is how well business holds up. It's still good for most companies, but there are a few reports of a slowdown. Says an eastern company: "The price of a product is still dependent on demand. If demand falls, I don't see how we can raise our prices." Lower copper quotations will also exert downward pressures.

This is the second of four articles on prices that affect metalworking. Component prices were dealt with Sept. 30. Construction prices will be covered Oct. 14 and consumer hard goods quotations Oct. 21.

An extra copy of this or other articles in the series is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.

AMA Opens Academy

The American Management Association has opened a $2-million Academy for Advanced Management at Saranac Lake, N. Y. Its purpose is to provide facilities for the uninterrupted study of business problems at all levels of management.

Classes in management techniques and the executive decision making course (STEEL, May 6, p. 53) have begun at the 90-acre facility in the Adirondacks. Twenty-one of some 60 buildings of the old Tredeau Sanitarium have been modernized to accommodate 125 registrants and 75 AMA personnel.

Eventually, 300 "students" will be accommodated at one time. Initial registration exceeded 1000.

Lawrence A. Appley, AMA president, says that within a year the academy will offer such courses as how to train and develop managerial personnel, techniques of visual presentations, and use of special communication tools.

New Spirals Are Predicted

Dr. Ewan Clague, making ten-year forecast before AMA, says more productivity is only answer. Republic's Patton urges industry to concentrate on human resources

CONSTANT price rises followed by plateaus of stability are in prospect for the U. S. economy for the next ten years, believes Dr. Ewan Clague, commissioner, Bureau of Labor Statistics.

Speaking before 1200 businessmen at the American Management Association's fall personnel conference in New York, Dr. Clague predicted: 1. Wages will keep going up. 2. Productivity will increase more rapidly than it has in the past. 3. Prices will continue to climb.

Three Spirals—Since World War II, says Dr. Clague, there have been three separate price spirals, each having a different cause.

In the first period, 1946-48, income and savings accumulated during the war years were being spent. More buying power than goods boosted wholesale prices 44 per cent during this period.

The inflationary cycle of 1950-53 was paced by the Korean War. This period saw a world-wide setup in consumer buying.

The present spiral began in 1955

Chicago Buildings Will Have Steel Curtain Walls

Now under construction, these five Chicago buildings will have curtain walls of stainless or porcelain-enameled steel. They are: (top to bottom, left) The Executive House, Morton Salt Co., and The Salvation Army buildings; (top to bottom, right) Mutual Trust Life and Borg-Warner buildings. Chicago Dynamic Committee has been formed to call attention to the city's building vitality. It will hold a workshop and forum for architects and builders Oct. 29-30 at the Museum of Science & Industry

and has been marked by a sharp upswing in labor and raw material prices. This period differs from the other two because the inflationary cycle is generated within the economy itself in the absence of any important external factors.

Answer—What can be done to halt the upward price cycle? Dr. Clague says the answer is greatly increased productivity (see STEEL, Sept. 30, p. 45).

Thomas Patton, president, Republic Steel Corp., Cleveland, agrees with Dr. Clague, and adds that industry will have to convince labor that productivity must keep pace with wages to achieve price stability.

Mr. Patton told the conference that industry's development of human resources has not kept up with its rapidly expanding technology. He added that more than 45 per cent of America's youth do not go to college and over 85 per cent never finish college.

What To Do—Mr. Patton listed five ways industry can help:

1. Dramatize the role people will play in the future of industry.
2. Clarify the changing needs of business and industry.
3. Invite students to visit offices and factories and observe how industry operates.
4. Sponsor university scholarships.
5. Take an active interest in local school affairs.

"Human skills will become increasingly important as we move into an era of science and automation," he said. "Our goal must be to motivate each child to achieve his maximum productiveness."

Human Quotient — Educating people is not enough, believes Mr. Patton. A company must go beyond that and make the best use of their talents. Here's how Republic believes this can be done:

Respect and make use of individual differences, not just their similarities. Personality traits as well as skill enter into a person's productiveness.

Watch for and nourish creativity. Don't be a slave to tradition. Keep the organization flexible. Resist the urge to regiment. Rigid personnel charts and procedures stunt development and growth.

Sales Dip 8 to 10%

Handling equipment volume in '57 slips from '56 levels but will partly recover in '58

ALTHOUGH SALES of material handling equipment are running 8 to 10 per cent below last year's, 1957 will still be one of the industry's best years.

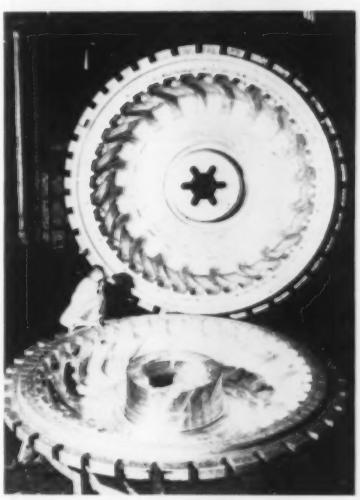
That's what STEEL learned from George G. Raymond Jr., president of the Material Handling Institute and executive vice president of Raymond Corp., Greene, N. Y. Compared with sales in 1955, this year's will be 12 per cent higher; they'll beat 1954's by 35 per cent.

Better in '58—Next year, Mr. Raymond looks for a 2 or 3 per cent gain in unit sales and a 5 to 6 per cent increase in dollar volume, compared with 1957. His opinion mirrors the outlook of other delegates to the institute's meeting last week at White Sulphur Springs, W. Va.

Figures aren't available on the entire handling equipment industry, but estimates put volume at about $2 billion in 1957. Some companies are doing more business this year because of the introduction of new products, more aggressive selling, and changing needs. Canmakers and stamping plants, for example, want heavier coils of steel. They require the development of trucks with elbow lifts, rather than the usual masts.

Prices—List prices on material handling equipment are up, but there's still a rash of price cutting in some segments, including industrial trucks. But equipment makers who are maintaining prices report little or no loss of business.

MHI has already signed up 110 exhibitors for its 1959 show in Cleveland. Plans are also underway for a 1962 exhibition in Chicago.



Alcoa Casts Tire Molds

Each section of these molds weighs 7500 lb. Goodyear Tire & Rubber Co., Akron, plans to use them for curing 2500-lb tires for the construction industry. The molds are almost 9 ft in diameter

Aluminum for Jets

New alloy containing lithium will maintain high strength at temperatures up to 400° F

NEW MARKETS for aluminum may be opened with the development of an aluminum-lithium aircraft alloy by Aluminum Co. of America. It is expected to increase the light metal's use in supersonic aircraft.

Conventional aluminum alloys begin to lose physical properties at 250 to 350° F. Alcoa claims that its new alloy, designated X2020, will maintain its strength at 400° F.

Advantages—Besides giving elevated temperature strength, lithium increases aluminum's modulus of elasticity by 8 per cent. It decreases weight by 3 per cent. The material can be fabricated by processes now used by the aircraft industry.

Samples are being sent to the Air Force, the Navy Department's Bureau of Aeronautics, and major aircraft companies. Alcoa expects to be prepared to produce the alloy in commercial quantities by the time it has been incorporated into aircraft design.

Builds Ball Bearing Plant

A $2-million precision ball bearing plant is under construction for Barden Corp., Danbury, Conn. The 125,000 sq-ft facility will be completed next June.

ODM's Gray Wraps Up Uniform Tool Program

DEFENSE MOBILIZER Gordon Gray has made the U. S. machine tool program uniform from agency to agency and department to department. Whether you lease tools from the Defense Department, Atomic Energy Commission, or General Services Administration, the rules will be the same. The Office of Defense Mobilization has high hopes that the program will save the government money and make users happy.

New uniform rental rates were set last June (STEEL, June 24, p. 80). Now ODM has established that:

1. Length of tool leases will be set specifically for the job to be done. (Leases have been three or five years, for example, without regard to the job. So the tools were used for nongovernment jobs or not used at all after the original job was completed.) 2. Purchase and renewal options will be few or nonexistent. 3. Procurement officers will see that tools are maintained in good condition by users. 4. Users will pay installation, transportation, and removal charges. 5. The cost of rebuilding or modernizing the tools will be added to their value and the rent readjusted.

6. Offset contracts (where prices to the government for products are lowered because of free use of tools) will continue, but their value will be specified, so the government will know exactly what it is getting.

The Result: An Over-All Tightening Up

A hint from the General Accounting Office (the watchdog bureau for government financial matters): "We are planning to keep our eye on this program."

The last provision of the tool program recommended by the interagency task force last May: Legislation has been introduced by Sen. John Sparkman (D., Ala.) which would put the rental receipts into a separate maintenance and modernization fund. Chances are fair that it will go through the next session.

A $70-Billion Budget for Fiscal '59?

Budget Director Percival Brundage has "no serious expectations" of holding fiscal 1959's budget down to $70 billion, the figure President Eisenhower is using for a measuring stick as he receives recommendations from agencies and departments. Mr. Brundage intimates the President's request next January will be under his request of $71.8 billion for fiscal 1958.

To hold the figure close to $70 billion, Mr. Brundage feels there must be cuts in the farm program, natural resources development, housing, labor, and welfare. A hike in postal rates would add about $500 million to the treasury's coffers.

No cuts below the $38-billion spending level for defense are foreseen in fiscal 1959 by Mr. Brundage. Defense spokesmen noted last week that they will need more than they got in fiscal 1958 ($35.4 billion of new spending authority) to stay at the $38-billion level because old funds are drying up.

No Tax Cuts for Fiscal '58

Commenting on the midyear review of the budget, Mr. Brundage notes an expected surplus of $1.5 billion in fiscal '58, instead of last January's hope for $1.8 billion. Although Congress cut over $5 billion from the President's original budget, it turns out that we are going to spend more than we thought.

Mr. Brundage cites these reasons: 1. The postal deficit. 2. Increased interest on the public debt (up $501 million since January). 3. Agricultural price supports (up $739 million). 4. Export-Import Bank loans (up $157 million). 5. Strategic material purchases (up $165 million).

Our surplus of $1.5 billion must go to reduce the national debt, says Mr. Brundage. That rules out any tax cuts effective this fiscal year. And how about fiscal 1959? The sensible answer is "no" if the surplus isn't any bigger than this year's, hints Mr. Brundage.

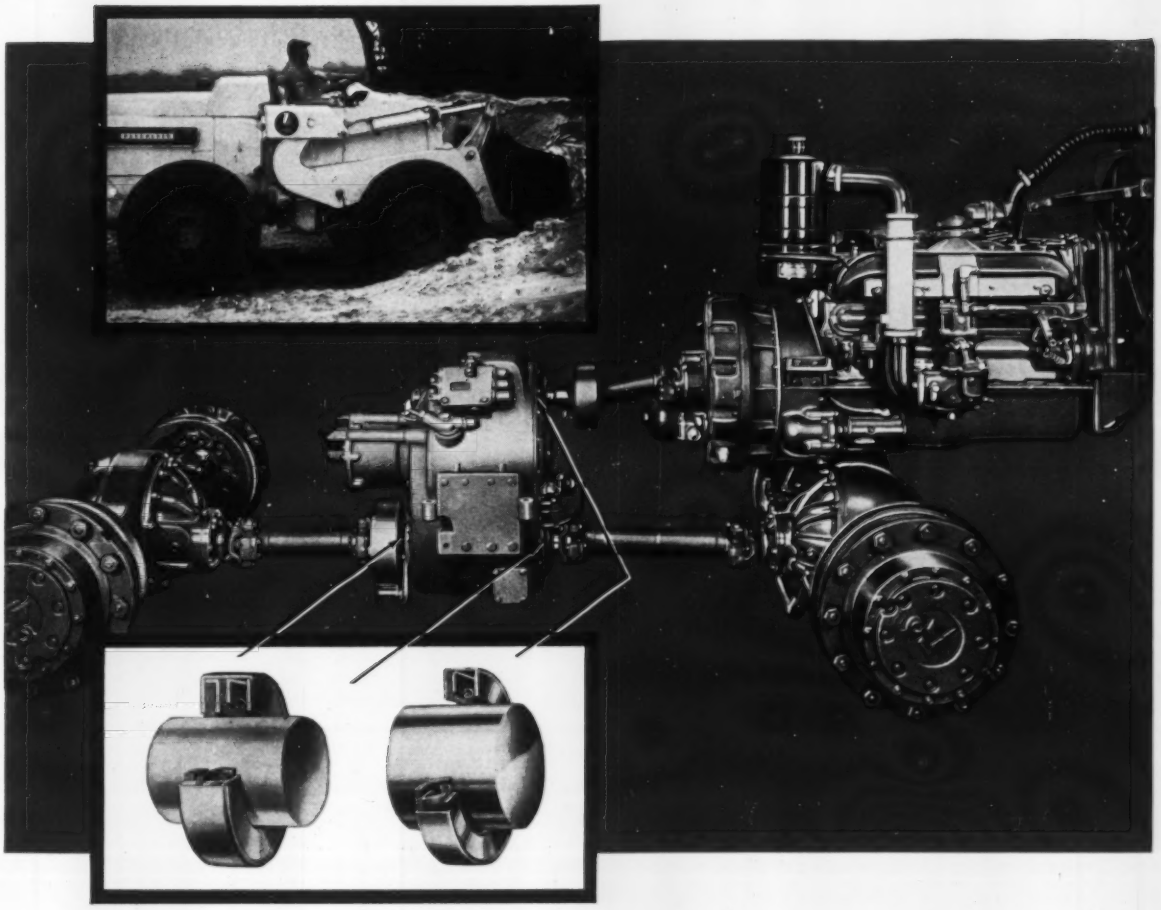
But Plenty of Tax Cut Talk

What Congress has to say about that will keep the Washington wires humming for quite a while. Both parties agree that an election year without a tax cut is unthinkable.

Indicative of the concern about taxes is the fact that a record 1538 tax bills were introduced in the 1957 session of the 85th Congress. Of those, only 21 were enacted into law. Of the remainder, important are the Forand Bill and the Mills Bill. The former, already approved by the House, proposes major changes in federal excise taxes. The latter would make technical changes in the income tax law, eliminate hardships, and close loopholes.

Capitol Notes

Sen. Charles Potter (R., Mich.) thinks the St. Lawrence Seaway will do all right under Commerce Department control after it is completed, but it should stay with the Corps of Engineers until then. . . The administration is seriously considering asking Congress for the right to supervise elections of union officials. . . The Kefauver hearings resume Oct. 21 with Bethlehem Steel Corp. taking the witness chair.



Keeps a workhorse working!

C/R lifeguards the power-shifted transmission in the big Hough "Payloader"

The new Hough Model HH "Payloader" is a big, tough tractor-shovel that wades through hard, rugged work day after day without flinching. Its power-shifted transmission makes it one of the fastest-maneuvering, easiest-handling tractor-shovels on rubber. To keep the transmission humming, two shafts must be protected: an input shaft turning up to 2,200 r.p.m., and an output shaft operating at speeds up to 3,000 r.p.m. All vital parts of the transmission are pressure-lubricated—the SAE 10 HD oil *must* be retained; dirt and grit *must* be excluded. C/R Type P and F Oil Seals with the Conpor K-400 sealing elements . . . specified by Hough engineers . . . have been performing with complete dependability well beyond the required 2,000-hour service life.

If you have similar problems involving lubricant retention or dirt exclusion, C/R Oil Seal engineers can help you. They'll select the correct seal for your application or gladly cooperate with you on special designs.

More automobiles, farm and industrial machines rely on C/R Oil Seals than on any similar sealing device.

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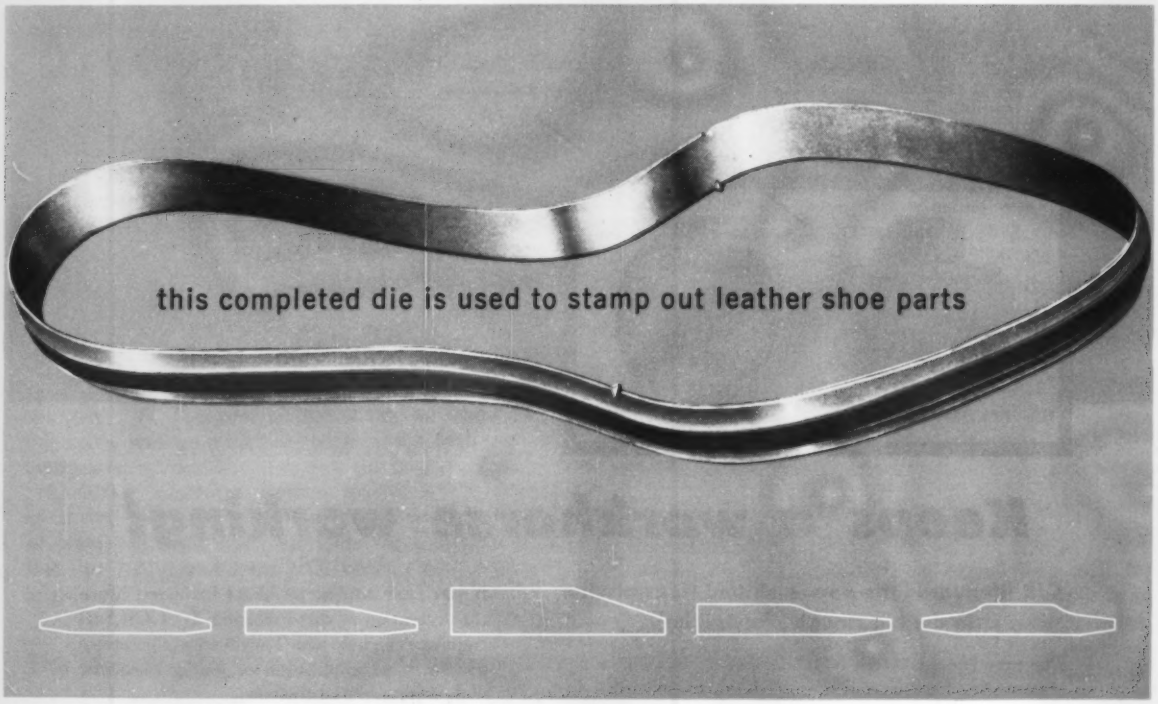
FOR CLOSE TOLERANCES—FINE FINISH



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What's more, *closely controlled* electric melting gives Crucible alloy clicker die steels maximum toughness, combined with just the right hardness after heat treatment. Edges *stay* sharp, yet are easy to file.

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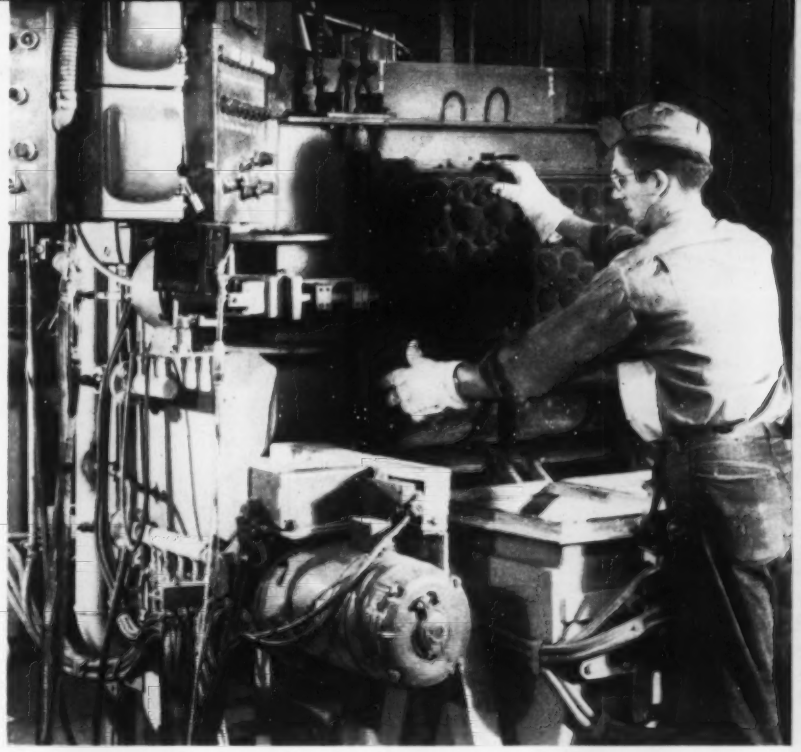


Gray Iron Trends

Shipping longer distances.
Better marketing methods.
More engineering service.
More uses for ductile iron.
Precision through shell molding.
Popularity of CO_2 process.
Making more complex castings.
Nonferrous "corner" in shops.

Gray Iron Summary

Sales: Down 15 per cent.
Prices: Up 5 per cent.
Backlogs: Down 40 per cent.
Delivery: Four days to four weeks.
Workload: 65 per cent of capacity.
Hours: About 35 per week.
1958: Slightly better than 1957.
Main market: Automotive.

Gray Iron Tonnage

1958*	13,900,000
1957*	13,300,000
1956	13,861,000
1955	14,838,000
1954	11,532,000
1953	13,708,000
1952	12,860,000
1951	14,989,000

Gray Iron Branches Out

AGGRESSIVE gray iron founders have tied engineering and market development into a sales effort designed to put new life into their slumping industry.

Aiding this attempt will be a 600-page customer handbook, soon to be published by Gray Iron Founders Society, Cleveland. It covers such topics as specifications, methods, purchasing, machining, heat treating, design, and properties and applications for gray and ductile iron.

The growing popularity of ductile iron (STEEL, Sept. 16, p. 130) is also expected to help the industry ride over the bumps.

Sales—Business is off because major customers (the appliance, automotive, and machine tool industries) aren't doing too well. A STEEL survey shows that only paper machinery, oil field equipment, and office equipment producers are buying more gray iron castings in 1957 than they did in 1956.

Donald Workman, executive vice president, GIFS, estimates 1957 dollar volume at $3 billion and production at 13.3 million tons.

In the first seven months of 1957, the industry shipped 7.5 million tons of castings, compared with 8.1 million tons in the like 1956 period.

Backlogs—STEEL finds that unfilled orders are down 42 per cent from their year-ago level. The delivery situation is good. When asked his average delivery time, one foundryman replied: "Do you want some tomorrow?" Delivery now generally takes four days to four weeks.

Outlook—Most foundrymen believe that 1958 will be 5 to 10 per cent better than 1957. An upturn in automobiles and machine tools would push 1958 tonnage over the 1956 mark. The expected rise in housing starts next year will help makers of soil pipe.

There is little agreement among producers on prospects for 1957's fourth quarter—40 per cent say it will be about like the second and third quarters; 30 per cent say it will be better; 30 per cent say "worse." Last quarter tonnage estimate: 3.2 million.

Elbow Room—Though competition remains intense, the field is no longer as crowded as it was after World War II. In the last two years, 143 gray iron shops have closed their doors; 809 have given up the ghost in the last ten years. "But the average foundry now produces 50 per cent more than it did ten years ago," Mr. Workman says.

Marketing—More foundries offer engineering aid. "Knowing the end use of a casting, a founder can often recommend a more economical design. Sometimes machining can be practically eliminated," states Mr. Workman. "More frequent sales calls leading to closer contact with customers bring about new uses for gray iron," he adds.

Gray iron castings are being shipped farther than ever before. About 30 per cent of the tonnage

finds its market over 200 miles from the foundry.

Trends — "Rising labor costs have made the foundryman more aware of the need for mechanization," states Lloyd Leeseberg, assistant general manager, Superior Foundry Inc., Cleveland.

Hamilton Foundry & Machine Co., Hamilton, Ohio, finds shell cores and the CO_2 process "most promising." Shell molding is gaining wide acceptance where precision is a major factor. Its use is dictated primarily by cost, with better finish as the deciding factor. "If better dimensional control and less pattern draft can be obtained with shell molding, the shell molded casting may be enough lighter than a green sand casting to justify the cost," states D. E. Krause, technical director, Gray Iron Research Institute, Columbus, Ohio.

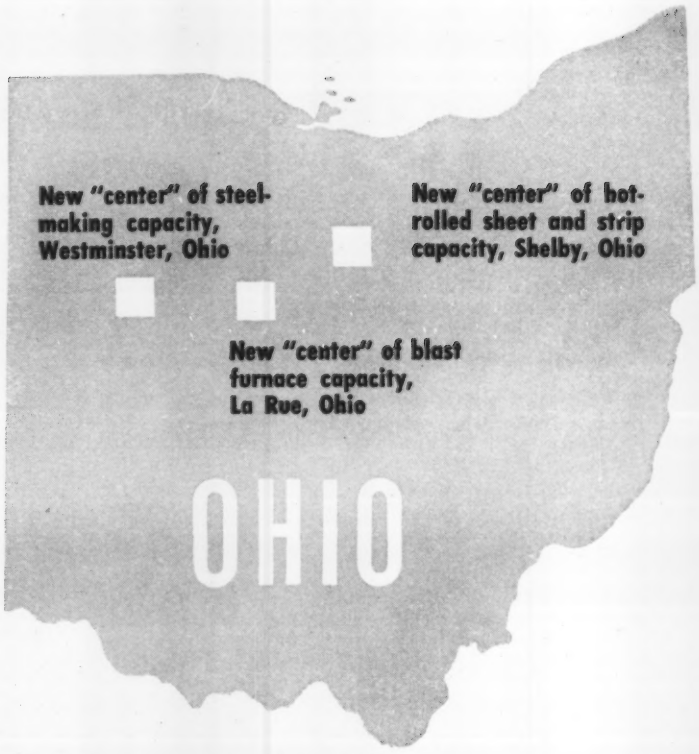
More Trends—"Close metallurgical control is a consistent demand," notes Zenith Foundry Co., West Allis, Wis. Machinability is being upgraded by injecting carbide to reduce sulfur and adding graphite to improve structure, says Mr. Krause.

More complex castings, wider weight range, and greater precision are other trends. Some gray iron founders have set up small nonferrous foundries in their shops. The added service to customers often results in more orders for gray iron castings.

Expansion—Despite the industry's 7 million tons of excess capacity, some foundries are adding facilities. Samples: Forest City Foundries Co., Cleveland, is building a 12,000 sq-ft coreroom. It has recently added a 7000 sq-ft cleaning department. The Electron Corp., Littleton, Colo., is modernizing and adding new larger machinery. Taylor & Co. Inc., Brooklyn, N. Y., will spend $80,000 for new equipment.

What's New?—Several foundries report that the output of gray iron gears is on the increase.

Use of high flowability sand to produce a mold with stable dimensions is gaining popularity. "Such molds not only produce castings within closer dimensional limits but will also be sounder and freer of shrinkage defects because of a lack of mold wall movement," states Mr. Krause.


New "center" of steelmaking capacity, Westminster, Ohio
New "center" of hot-rolled sheet and strip capacity, Shelby, Ohio
New "center" of blast furnace capacity, La Rue, Ohio
OHIO

Steel 'Centers': Slight Shift

Three geographic centers of the iron and steel industry have moved apart, but remain within 35-mile radius in northwestern Ohio, says American Iron & Steel Institute

WESTMINSTER, Ohio, eight miles southeast of Lima, is the new geographic center of steelmaking capacity.

The 1957 center of blast furnace capacity is La Rue, Ohio, 13 miles west of Marion. Shelby, Ohio, 12 miles northwest of Mansfield, is the center of hot-rolled sheet and strip capacity.

Six years ago (when they were last computed), the centers were closer together. The steelmaking center was Mt. Cory, Ohio; it has moved 17 miles southwest. The center of blast furnace capacity shifted 10 miles east. The largest move was made by hot-rolled sheet and strip capacity; its center shifted 40 miles northeast from Wharton, Ohio.

A "tons-times-miles" method is used to determine the geographic centers. Thus, the effect of a given plant capacity is in proportion to its distance from the geographic center.

The relatively small moves in the geographic centers in the past six years emphasizes that, instead of being centralized, capacity increases have been dispersed.

Eight Top West German Firms' Steel Production and Investment

	1956 Production Millions of net tons	Investments 1951-56 Millions of dollars
Dortmund-Hoerder Huttenunion, Dortmund	2.9	$112
Huttenwerk Rheinhausen, Duisburg	2.0	77.7
Klockner-Werke, Duisburg	1.8	82
Huttenwerk Oberhausen, Oberhausen	1.7	79
Westfalenhutte, Dortmund	1.7	103
Mannesman AG, Dusseldorf	1.7	65
August Thyssen-Hutte, Duisburg	1.6	127.3
Bochumer Verein, Bochum	1.2	51.5

Europe Ups Competition

STEEL EXPORT competition is stepping up in West Europe. West Germany will lose some of its price advantage in the face of union demands for a 10 per cent wage increase and reduction of the work week from 45 to 42 hours.

Italy plans to increase its production from 6 million to 10 million tons by 1960 and will seek to build up its exports accordingly.

West German exports outside the European Coal & Steel Community (ECSC) have already dropped off as steel prices in the world market have lowered.

Buying Drops — German mills have an order backlog of 6.6 million tons for crude steel, but forward buying has dropped off as production has increased and because of a building and construction decline.

Dr. Salvatore Magri, president, Dalmine S.P.A., Milan, Italy, says his company, the third largest European producer of steel pipe and casing, plans to increase exports. Now visiting in the U. S., Dr. Magri reports his firm has five operating mills capable of producing 600,000 tons of pipe yearly. He estimates that 40 per cent of this output is for export. The U. S. receives 20,000 tons annually, mostly for oil country customers. The power industry takes some heavy wall piping.

Curve Continues Up—The accompanying table of minimum export prices agreed upon by the Brussels, Belgium, export cartel over the last five years shows the rising trend. The prices are in dollars per metric ton, f.o.b. European port. A net ton would cost about 10 per cent less.

Canada Ups Capacity

Canada's booming steel industry has increased its capacity by 70 per cent in the last ten years. Present rated capacity: 5.25 million ingot tons.

Plants in the dominion now supply 62 per cent of Canada's steel requirements, and they will continue to grow, said V. W. Scully, president, Steel Co. of Canada Ltd. He addressed a regional meeting of the American Iron & Steel Institute in Buffalo.

Canada supplies all of its own tin plate requirements. It also has continuous hot strip mills, cold reduction mills, electrolytic tinning lines, continuous galvanizing lines, plate mills, and continuous annealers. One plant makes steel by the oxygen converter process; another is being built.

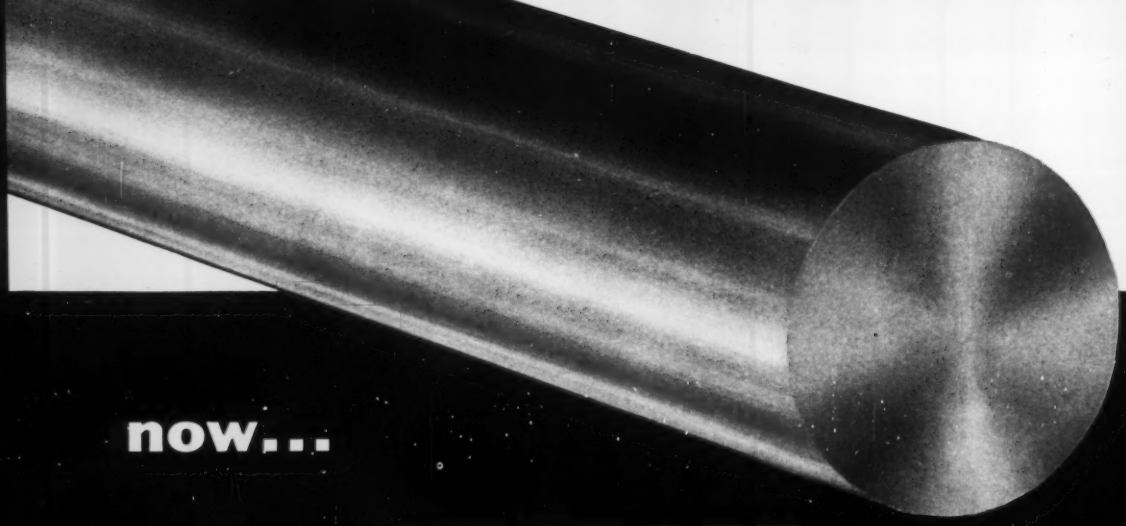
"However, Canada can't free itself from dependence on the U. S. for steel imports until her population is much larger," stated Mr. Scully.

Growth at Border — Buffalo's steelmaking capacity has increased 80 per cent (to 6.9 million tons) since 1940.

Brussels Steel Export Prices

(Dollars per metric ton)

	Bars	Structurals	Wire Rope	Plates	Ship Plates
1957	$118	$123.50	$112	$135	$177.50
1956	108	110.00	110	120	150.00
1955	100	97.00	104	104	120.00
1954	84	84.00	88	98	107.50
1953	93	93.00	87	115	150.00



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and the pennies you save add up to dollars!

New Copper-Controlled Chemistry improves machinability, gives added wear resistance, and resists corrosion

Production increases by as much as 15% to 50% have been achieved in customer tests comparing STRESSPROOF with and without copper.

The controlled addition of copper to the STRESSPROOF chemistry improves machinability, gives added wear resistance, and resists corrosion. In addition, yield strength is guaranteed . . . 100,000 p.s.i. in sizes through 2" and 90,000 p.s.i. in sizes over 2"—*and* STRESSPROOF requires no heat treating.

JUST PUBLISHED: A new engineering report. "The Effect of Copper, Abnormally Heavy Drafts, Furnace Treatment and Die Practice on STRESSPROOF Steel Bars." Copies are available on request.

La Salle **STEEL CO.**

1414 150th Street, Hammond, Indiana

U. S. Passenger Car Production

(Thousands of units)

	First Half		Second Half		Totals	
	1957	1956	1957*	1956	1957*	1956
GM	1543	1729	1323	1333	2866	3062
Ford	1015	869	903	800	1918	1669
Chrysler	721	474	511	396	1232	870
AMC	55	61	48	43	103	104
S-P	37	60	44	36	81	96
Totals	3371	3193	2829	2608	6200	5801

*Projected by STEEL.
Source: Ward's Automotive Reports.

'57 Cars: Orderly Cleanup

Dealers anticipate no trouble clearing out this year's cars. Chevy seems to be key to 6 million sales. Boost in light duty models will hold truck sales close to '56's

RUMORS of 1958 car price increases are making it easy for dealers to clear out '57 stocks at a rate of better than 15,000 sales a day.

Dealers have about 750,000 cars in stock. About one-quarter are 1958 models.

At the present pace, '57s should be pretty well cleared out by mid-November.

Introductory dates of new models are about a week later than last year's, which will insure a clean sweep.

No Strain—Across the country, the attitude is that the industry will have little trouble selling 6 million cars this year.

That's also the official estimate of L. L. Colbert, Chrysler Corp.'s president.

Production is expected to hit 6.2 million.

Key Car—Whether sales reach 6 million depends greatly on Chevrolet, thinks the industry.

If the '58 Chevy clicks with the buying public, the GM division will have time to peddle enough cars to make the difference between 5.9 million and 6 million car sales by Dec. 31. More important: Chevy still has a good chance of overtaking Ford in the 1957 sales race.

Trailing — At the end of last month, Chevy was about 43,000 units behind Ford in sales.

Productionwise, the two lines have been close through the second half. Estimates for three quarters' production put Ford at 1,170,000 to Chevy's 1,124,400 assemblies.

Part of this time Chevy was down for model change, so the Ford total is 15,000 to 20,000 cars higher. Chevy will have its chance this month when Ford makes the switch.

Primed—The GM division has cut dealer stocks as low as possible so it will be ready for a head start when the '58s appear.

And in case the going gets tough, dealers are prepared to preregister as many cars as they need and sell them later. (Registrations usually appear before sales. This way, no matter who finally wins, the claims and counterclaims will furnish sales ammunition well into the first quarter of next year.)

Outlook—Here's what the rest of 1957 looks like in a quick sales rundown:

- New car sales will be almost exactly 6 million.
- Production will add up to 6.2 million.
- Chevy can upset Ford if the public buys Chevy styling.
- The industry should enter 1958 with about 250,000 cars in dealer stocks.

Trucks Still Stable

Domestic truck sales are expected to equal or better the 910,000 units sold last year.

Production probably will be

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Top Production Years

(In millions)

1955	9.2
1950	8.0
1953	7.3
1957	7.2
1956	6.9

Includes U. S. cars and trucks.
Source: Ward's Automotive Reports.

slightly lower. *Ward's Automotive Reports* estimates 1,095,000 trucks will be produced, compared with 1,104,325 during 1956. Fewer exports are the main reason for the slight slump in output.

Slider—Since May, truck assemblies have steadily trended downward from a high of 103,000 units. The low point came last month when about 64,000 trucks were built. Last year's low also was September with a 61,000 total.

Booster—Sparking the sales picture this year are light trucks which have increased their share of the market by almost 4 per cent. The 5 per cent rise in farm incomes is credited with making more sales possible in this group.

Heavy and medium truck sales are down. Medium trucks took 21.1 per cent of last year's market. This year they're accounting for 19.3 per cent. Heavy duties racked up 20 per cent in '56, against an estimated 18.2 per cent so far this year.

Typical—White Motor Co.'s half-year report is indicative of the heavy duty sales slump.

White's six months sales total $109.8 million, down some $2.7 million from last year. Net income is $3.3 million.

New Items—Trucks traditionally don't follow the same model change pattern as the auto industry. But builders do try to keep up with trends. Last year, GMC introduced air suspension on many of its trucks after a successful three-year trial on buses.

In keeping with the swing to air suspension, it looks like more air bags will appear on competitive truck lines throughout the year. One advantage: Maintenance and replacement, costly items for truck fleets, are lower since air suspension units need no lubrication.

Chrysler Keynotes '58

Conservative estimates are the style for 1958. After being wrong for three years, the industry has decided it's better to be on the low side in predicting production.

At the Chrysler press preview held at the end of September, Mr. Colbert pegged next year's output at 6 million units.

It agrees with the estimate made earlier by Edward T. Ragsdale, general manager of GM's Buick Div. George Romney (AMC head) says 6.2 million will be built.

Behind the scenes, the industry has adopted a slightly more hopeful tone. Unofficial predictions still maintain output will come closer to 6.4 million or 6.5 million assemblies.

The key still seems to be how many credit buyers have paid off '55 and '56 cars and are willing to return to the market. If next year's models are significantly different, there are enough potential buyers to make a 6.5 million production year come true again.

Long View—Looking at another phase of the business, Mr. Colbert spelled out some facts which the industry will use as building blocks in labor contract talks coming up.

Says Mr. Colbert: "Between 1955 and 1965 the number of people between 25 and 44 will decrease while the population as a whole is increasing by 28 million.

"It will be at least seven years before this condition begins to correct itself. In the meantime, proportionately fewer people will have to produce more efficiently to provide goods and services for many more people."

This means more efficient production tools must be developed to replace persons. Mr. Colbert says such investment is one of the best ways of slowing down inflation (Chrysler plans to spend $130 million on plant and equipment next year).

In effect, Mr. Colbert has outlined arguments the industry will use to support automation advances against labor's claims of growing unemployment.

It also tends to put the blame for inflation on union shoulders.

U. S. Auto Output

Passenger Only

	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
April	549,239	547,619
May	531,365	471,675
June	500,271	430,373
July	495,629	448,876
August	524,854	402,575
8 Mo. Total	4,393,371	4,044,052
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Aug. 31	118,563	58,166
Sept. 7	90,704	47,827
Sept. 14	85,816	63,798
Sept. 21	52,365	35,652
Sept. 28	51,528†	43,369
Oct. 5	35,000*	59,351

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Ford, UAW Call SUB Truce

Ford Motor Co. and the United Automobile Workers have agreed on a plan to protect the equity of Ford workers in Ohio on SUBenefits to be paid during current model changeover layoffs.

Ohio does not permit the payment of SUB claims under state laws, making it illegal to pay double benefits. Both Ford and the union are appealing a decision in a test case.

Under the substitute plan, SUB funds are kept in escrow, and claims will be processed (but not paid) until a new method of payment can be worked out.

Since the feeling is that some legal type of payment will be agreed on, the implication seems to be Ohio will change its SUB laws following present appeals.

Exhaust Notes

- Ford Div. is spending $185 million designing, engineering, and tooling its 1958 cars.
- Mack Trucks Inc. announces it will introduce a long distance luxury bus which accommodates 41 passengers. It will have air conditioning, air suspension, and will be sheathed in anodized aluminum.

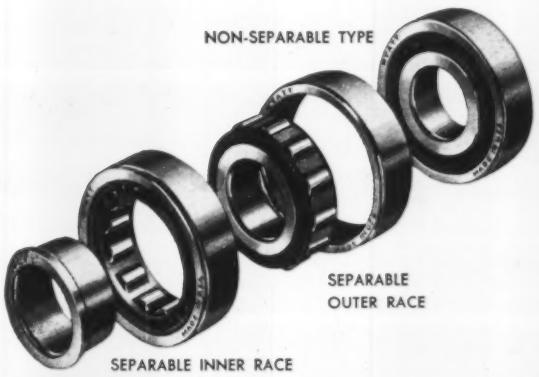
THE HEAVIER THE LOAD...

the more you need HYATTS . . . because size for size, no other kind of bearing made can equal straight cylindrical roller bearings for sheer load-carrying capacity in heavy-duty service. That's why John Deere uses HYATTS in this combine.

THE HIGHER THE SPEED...

the more you need HYATTS . . . because their uncompromising combination of superior steels, precision manufacture and scrupulous control of internal clearances assures smoother performance in high-speed applications like the famed *Firebird II.*

THE MORE YOU NEED *Cylindrical* HY-ROLL BEARINGS



Today, with loads and speeds trending upward and space often at a premium, many a manufacturer is finding that bearings of limited capacity are no longer good enough. If you are seeking ways to squeeze better life/load ratings into smaller housings, HYATT has the answer. Shouldered-race HYATT HY-ROLLS will not only solve your radial load problem but take a surprising amount of thrust, too. Ask your nearest HYATT Sales Engineer for recommendations—he's a mighty good man to know! Hyatt Bearings Division, General Motors Corporation, Harrison, N.J.; Pittsburgh; Detroit; Chicago; and Oakland, California.

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GM GENERAL MOTORS

HYATT HY-ROLL BEARINGS

THE "WORKHORSES" OF MODERN INDUSTRY

ECONOMIC FACTS ON FASTENERS

COARSE THREADS LEAD TO LOWER ASSEMBLY COSTS

- **Fasteners with coarse threads assemble faster, easier**
- **Make a stronger joint, too**

Big savings hide in small details . . . in the threads of bolts, nuts and cap screws, for example.

Coarse threaded fasteners tighten with only two-thirds the revolutions needed for fine threads . . . speeding assembly. Coarse threads enter nuts or mating holes with less tendency to cross thread when not truly positioned. Often this ease of starting is a decisive production advantage. Even in *handling*, there's an advantage. Coarse threads need less "babying" to avoid damage.

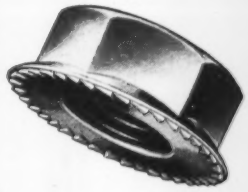
• **More strength.** With greater resistance to stripping, coarse threaded fasteners can be tightened more for a stronger assembly.

Yes, even with standard fasteners there are ways to save money and improve quality . . . by looking at your products through the eyes of an RB&W Fastener Man. His service is available just for the asking. Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, New York.

R B & W

112th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas; San Francisco. **Sales agents at:** Milwaukee; New Orleans; Denver; Fargo. **Distributors from coast to coast.**



Spin-Lock Nuts dig in to stay tight

The photograph shows the many hardened "anchors" on the flange of a Spin-Lock Nut. These "ratchet-action" teeth require 20% more torque to loosen than to tighten. They bite in as the nut turns down on its seat. Like Spin-Lock Screws, these nuts can stay put in products subject to vibration and cyclic temperature variations. Send for bulletin.

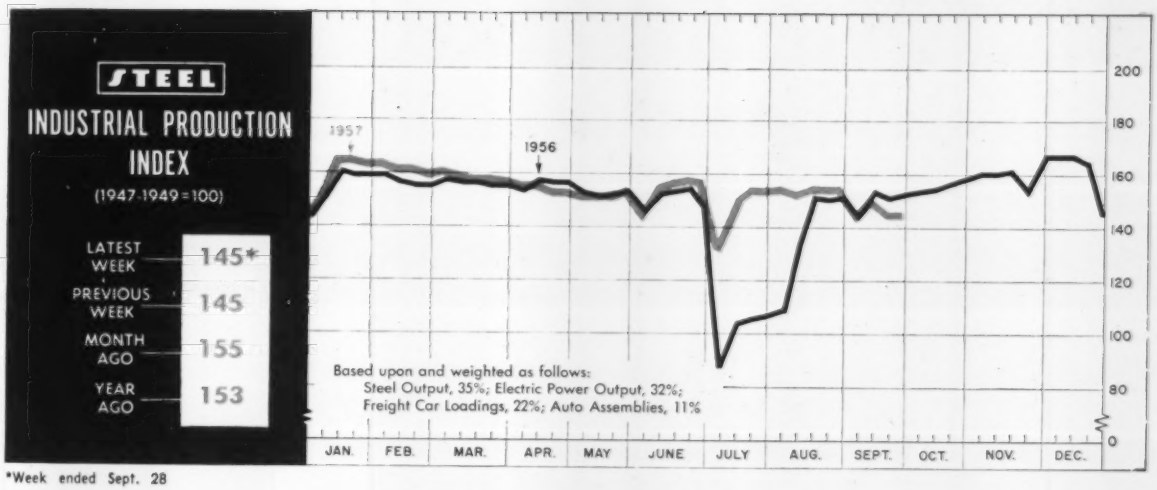
High strength bolts save costly crane

At one company's plant, a large, heavy-duty crane had deteriorated due to rivets loosening. Replacing with new rivets was no permanent answer, but RB&W high tensile bolts were.

Used with hardened washers, these RB&W bolts clamp members together so tightly, no slipping into bearing takes place, holes are reinforced against fatigue, and connections become vibration-proof.

Assembling heavy duty equipment with RB&W high strength bolts in the first place can avoid such problems and create more satisfaction with the product.

RB&W FASTENERS—STRONG POINT OF ANY ASSEMBLY



*Week ended Sept. 28

Fourth Quarter Upturn Is a Little Tardy

FOR THE FIRST time in many years, industrial production failed to return to pre-Labor Day levels last month. September was almost devoid of any upward pressure, which resulted in the lowest monthly average for the year to date (see chart above) and the lowest September average since 1954.

The anticipated upturn in steel did not materialize; freight car loadings fell below the August average; auto producers went into model changeover; and output of electric energy dropped as the weather became cooler. Only auto production and power generation showed increases over year-ago figures, and those gains narrowed as the month wore on.

Upturn Still Ahead?—There are two ways of looking at the delay in the traditional fall upturn. Some feel that basic demand for goods and services remains as strong as ever and that any delay will simply make the upsurge more certain in the fourth quarter. Others feel that the situation is a delayed reaction to sluggish industrial production throughout the year and will result in further softness in fourth quarter. October will be a crucial month in determining which view is correct.

Disappointing as September was to some people, it still does not change the status of 1957 as one of the best years on record. The tendency is to compare it to 1956, which was a 10½-month year for the steel industry because of the steelworkers' strike. After settlement of the strike, there was tremendous pressure to make up for some of the lost production. It resulted in an abnormally high reading on STEEL's industrial production index as well as the Federal Reserve Board's index. There is no such pressure this year.

Instead, 1957 has been marked by an unusually steady, high level of production with a minimum of seasonal fluctuations. There are three primary causes for this level-

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,108[1]	2,105	2,506
Electric Power Distributed (million kw-hr)	11,950[1]	11,991	11,365
Bituminous Coal Output (1000 tons)	10,060[1]	10,100	10,050
Petroleum Production (daily avg—1000 bbl)	6,800[1]	6,840	7,044
Construction Volume (*ENR*—millions)	$342.3	$328.7	$483.4
Auto, Truck Output, U. S., Canada (*Ward's*)	61,439[1]	68,875	102,196
TRADE			
Freight Car Loadings (1000 cars)	735[1]	725	831
Business Failures (Dun & Bradstreet)	287	237	262
Currency in Circulation (millions)[3]	$31,052	$31,184	$30,714
Dept. Store Sales (changes from year ago)[3]	−4%	0%	+8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,007	$23,981	$22,895
Federal Gross Debt (billions)	$271.9	$273.3	$274.4
Bond Volume, NYSE (millions)	$23.3	$17.5	$18.3
Stocks Sales, NYSE (thousands of shares)	12,640	8,180	9,788
Loans and Investments (billions)[4]	$87.1	$86.6	$85.8
U. S. Govt. Obligations Held (billions)[4]	$24.7	$24.8	$26.4
PRICES			
STEEL's Finished Steel Price Index[5]	239.15	239.15	225.71
STEEL's Nonferrous Metal Price Index[6]	209.7	209.7	264.3
All Commodities[7]	117.7	117.9	115.2
Commodities Other Than Farm & Foods[7]	125.7	125.8	122.6

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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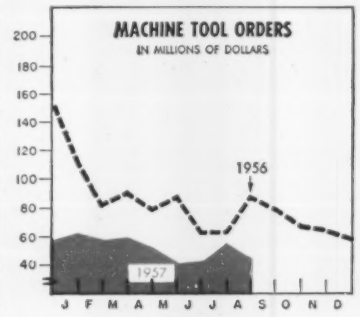
THE BUSINESS TREND



(Thousands of dollars)

	New Orders		Shipments	
	1957	1956	1957	1956
Jan.	63,250	109,550	76,550	54,600
Feb.	58,200	81,300	77,700	64,600
Mar.	58,900	89,500	89,100	74,150
Apr.	51,300	79,300	87,800	71,800
May	41,400	87,100	78,500	76,800
June	43,100	61,850	82,950	76,250
July	55,500	61,900	58,700	65,150
Aug.	44,650*	87,500	63,500	75,100
Sept.	.....	78,450	.....	71,100
Oct.	.....	66,100	.....	89,750
Nov.	.....	64,250	.....	81,700
Dec.	.....	57,200	.....	85,150
Totals	.....	924,000	.....	886,150

*Preliminary.
National Machine Tool Builders' Assn.

	1957	1956	1955
Jan.	7,380	10,244	4,973
Feb.	8,373	12,163	5,616
Mar.	9,090	7,025	7,345
Apr.	3,164	8,803	7,639
May	3,994	3,667	6,205
June	2,974	4,748	5,812
July	4,332	4,140	4,338
Aug.	3,924	6,722	6,273
Sept.	....	3,057	8,351
Oct.	....	8,741	9,575
Nov.	....	3,986	6,180
Dec.	....	5,858	11,105

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.

Charts copyright, 1957, STEEL.

ing out: 1. Reduction of the number of major industry strikes because of long term labor contracts. 2. Attempts by several industries to even out employment peaks and valleys to avoid heavy SUB payments. 3. Sufficient capacity in almost every line to assure delivery when required.

Those conditions will carry over into 1958 (with the possible exception of a strike in the automotive industry), resulting in another even year. By 1959, demand may be catching up with capacity and long term labor contracts will come up for renewal. They may bring on another "pressure" year.

1957 Still the Best

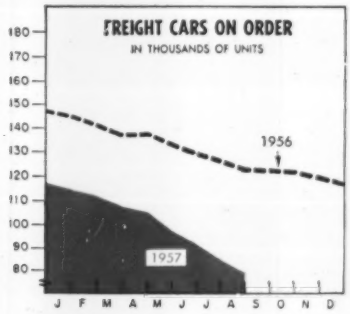
Production in the fourth quarter could hang considerably below that of the similar period of 1956 without spoiling the chances for a record weekly average for STEEL's index. The average last year was 150.6 (1947-49=100). Through the week ended Sept. 28, the average is 155.2. Even if the fourth quarter were to continue at the September rate, the yearly average would be 152.5. That is not likely.

Three of the four factors in STEEL's index will expand in the next three months. Steel operations, which have held at about 82 per cent of capacity for four weeks, will pick up. Inventories are so low that consumers must buy for current usage if not for inventory buildup. Resumption of full-scale auto production this month will be the biggest source of new orders.

Detroit is still planning to match the rate of production established during 1956's final quarter. The low point of model changeover was reached last week when only Chrysler Corp., Edsel and Lincoln-Mercury divisions of Ford Motor Co., and the independents were turning out '58 models in volume. By this week, most of General Motors Corp.'s divisions will be back in operation, followed by this year's volume leader, Ford.

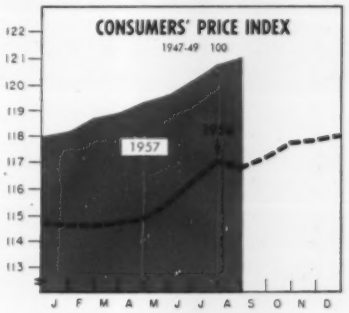
Output of electric power is between two peaks now, with the uptrend slated to begin in late October as heavier industrial production and shorter daylight hours increase usage.

The only weak spot during the fourth quarter will be freight car loadings, which will drop sharply at the close of the Great Lakes shipping season. The 13 regional Shippers Advisory Boards of the



	Awards		(end of month)	
	1957	1956	1957	1956
Jan. ..	5,328	1,818	114,656	144,946
Feb. ..	6,065	1,675	111,965	141,437
Mar. ..	5,359	1,618	107,708	137,070
Apr. ..	6,429	6,559	105,190	137,436
May ..	3,423	2,403	97,006	133,072
June ..	4,918	2,859	91,810	129,409
July ..	1,251	2,642	85,229	126,194
Aug. ..	3,203	2,575	79,258	122,870
Sept. ..	....	3,949	.....	122,421
Oct. ..	....	6,532	.....	122,250
Nov. ..	....	4,172	.....	119,626
Dec. ..	....	4,992	.....	117,320
Total .	....	41,794		

American Railway Car Institute.



	1957	1956	1955
Jan.	118.2	114.6	114.3
Feb.	118.7	114.6	114.3
Mar.	118.9	114.7	114.3
Apr.	119.3	114.9	114.2
May	119.6	115.4	114.2
June	120.2	116.2	114.4
July	120.8	117.0	114.7
Aug.	121.0	116.8	114.5
Sept.	....	117.1	114.9
Oct.	....	117.7	114.9
Nov.	....	117.8	115.0
Dec.	....	118.0	114.7

U. S. Bureau of Labor Statistics.

Association of American Railroads anticipate that loadings during the fourth quarter will fall 2.1 per cent shy of those in the corresponding period of 1956.

Tool Orders on Downtrend

The machine tool industry, which has had its backlog whittled from 7.7 months to 4.1 months since August, 1956, is still headed for a good year as far as shipments are concerned. But the low rate of new orders points to a slower rate of building in the fourth quarter and early 1958. After picking up considerably in July, net new orders fell off in August to $44,650,000, the third lowest figure for the year. Shipments picked up from the August level to $63.5 million, but this was far below the first-half rate (see table, Page 138),

Tool builders have been confident that a pickup in orders would turn up in the fall, mainly because inquiries have been at a surprisingly good level. But buyers are exercising more than usual caution in following up with firm orders. Tight money has been cited as one primary reason. But Thomas E. Lenihan, president of C.I.T. Corp., New York, declares that there is still enough available to permit the purchase of machinery and equipment "needed to decrease costs and increase profits."

Auto companies, which constitute one of the largest buying groups, reportedly could turn the tide with commitments for tooling on new engines and model changes coming up in 1959 and 1960. But auto executives apparently are waiting until the first of the year to see how much cash new models bring into the till before going out on the limb.

Trends Fore and Aft

• Orders and shipments of fabricated structural steel went in opposite directions to a marked degree in August, reports the American Institute of Steel Construction. Shipments set a record at 333,133 tons; orders, at 167,083 tons, hit the lowest point since November, 1953. The backlog settled to 2,962,000 tons, which is still only 4 per cent below the year-ago level.

• Reporting members of the National Association of Purchasing Agents report both production and new orders showed improvement in September. Inventories and employment were lower.

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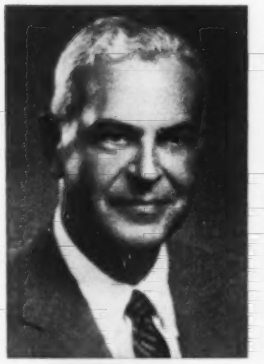


JAMES P. RAUGH
heads Porter's Refractories

FRANCIS G. GREAVES
Marlin-Rockwell purchasing post

DR. I. A. OEHLER
American Welding & Mfg. exec.

CHARLES S. ROCKWELL
heads Ford Instrument Co.

James P. Raugh was named vice president and general manager, Refractories Div., **H. K. Porter Company Inc., Pittsburgh.** He previously had been vice president-operations for General Refractories Co.

Francis G. Greaves was made purchasing agent, Plainville, Conn., division, **Marlin-Rockwell Corp.,** succeeding **John B. Korb,** retired. Mr. Greaves was assistant director of purchasing at Plainville.

James E. Hill was made sales manager of **Precision Extrusions Inc.,** Bensenville, Ill.

James J. Walsh was made general manager, **Tool Supply Co.,** Cleveland. He was district manager at Detroit for the cutting tool division of Motch & Merryweather Machinery Co.

Thomas J. Gorman was made director of purchases, **Quaker Rubber Div.,** H. K. Porter Company Inc., Philadelphia.

Vard Inc., Pasadena, Calif., named **John A. Swint** president; **Harold J. Morris,** vice president-engineering; **Phillip R. Heim,** executive vice president-manufacturing.

Mark T. Gilkison was made manager, industrial sales division, **Gates Rubber Co.,** Denver.

George W. Sinclair, works manager at the Tucson, Ariz., facility of **Hughes Aircraft Co.,** was named plant manager to succeed **Roy E. Wendahl,** now vice president-sales, at Culver City, Calif.

Dr. I. A. Oehler was elected executive vice president, **American Welding & Mfg. Co.,** Warren, Ohio. He was vice president-operations.

Robert K. Lohman was made sales manager, **Cargotainer Div.,** Tri-State Engineering Co., Washington, Pa. He was manager of material handling sales, Pittsburgh Steel Products Div., Pittsburgh Steel Co.

William G. Wells fills the new post of assistant division manager at the Cleveland division plant of **Harris-Seybold Co.** He is replaced as works manager by **John E. Bauernschmidt.**

Edwin T. Asplundh was elected chairman, **Pittsburgh Plate Glass Co.,** Pittsburgh. He succeeds **Harry B. Higgins,** who retires as chairman and chief executive officer. **David G. Hill,** who continues as president, assumes additional duties of chief executive officer. **Felix T. Hughes** succeeds **D. C. Burnham,** retired, as vice president-merchandising division.

W. B. Jones was made sales manager-agricultural products, **Crucible Steel Co. of America,** at Pittsburgh. He is assisted by **J. A. Scanlon,** acting sales manager since June. Mr. Jones was supervisor of agricultural sales at Chicago.

Karl L. Miller was made assistant to the president of **Buffalo Bolt Div.,** Buffalo-Eclipse Corp., North Tonawanda, N. Y., a new position. He was Chicago regional sales manager for Columbus McKinnon Chain Corp.

Charles S. Rockwell, vice president-general manager, was elected president and general manager of **Ford Instrument Co. Div.,** Sperry Rand Corp., Long Island City, N. Y. He succeeds **Raymond F. Jahn,** retired. Mr. Rockwell also assumes the presidency of Sperry Farragut Co. Div., a post Mr. Jahn also held.

A. D. Foote was named assistant director of purchases, **Allis-Chalmers Mfg. Co.,** Milwaukee. He succeeds **C. H. Norton,** retired.

John A. Sargent resigned as president of **Diamond Alkali Co.,** Cleveland. **Raymond F. Evans,** chairman and chief executive officer, assumes presidential duties and responsibilities. **A. H. Ingley,** senior vice president, fills the new post of executive vice president. **Fredrik H. Raedel Jr.** was made sales manager-consumer products.

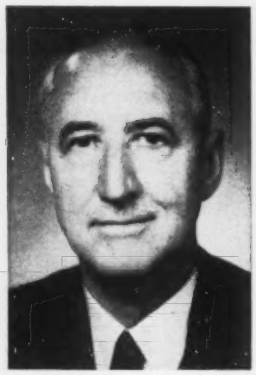
Chicago Vitreous Corp., Cicero, Ill., promoted **L. A. Johnson** to manager, frit sales and service; **H. J. Van Dolah,** director of research.

William D. Crawford was made manager, eastern division, **National Supply Co.,** with headquarters in Toledo, Ohio. He succeeds the late **Roger L. Dailey.**

W. Bradley Blair was made director of sales, **Fairmont Aluminum Co.,** Fairmont, W. Va., subsidiary of Cerro de Pasco Corp. He was Chicago sales manager.

Marc Janes was made assistant

MAXWELL D. MILLARD



HOWARD B. MAGUIRE

American Steel & Wire sales posts

RALPH C. MOFFITT

WILLIAM W. CRAWFORD

U. S. Steel Corp. purchasing positions

manager-sales, Buffalo district, **Bethlehem Steel Co.**

Maxwell D. Millard was named assistant vice president-sales, **American Steel & Wire Div.**, U. S. Steel Corp., Cleveland. He is succeeded as general manager-sales by **Howard B. Maguire**, former central area sales manager, Cleveland. **Norman M. Sted** succeeds Mr. Maguire.

Stanley Marwin was made assistant works manager, Los Angeles plant, **American Manganese Steel Div.**, American Brake Shoe Co.

W. J. Bolton was appointed an assistant general manager of **Bethlehem Pacific Coast Steel Corp.'s** Seattle plant.

A. S. Chivers was elected vice president-western division, **Barry Controls Inc.** He was general manager of the western division plant at Burbank, Calif.

Julian A. Terpenning was made product manager, foundry resins, at **Archer-Daniels-Midland Co.**, Cleveland. He is at ADM's Newark, N. J., resin laboratory.

Thor Power Tool Co. named **A. V. Moroz** electric tool sales manager, Chicago branch, to succeed **Arthur H. Nelson**, retired. **James P. Stine** was made manager, New York branch, to succeed **W. J. McGraw**, recently named manager, electric tool division.

Richard R. Read was made branch manager, Detroit office, **Taft-Peirce Mfg. Co.** He is replaced as sales manager, Rochester, N. Y., office, by **Herbert A. Potter.**

Ralph C. Moffitt succeeds **Carl A. Ilgenfritz**, retired, as vice president-purchases, **United States Steel Corp.**, Pittsburgh. **William W. Crawford** succeeds Mr. Moffitt as director of purchases.

Dr. Klaus C. Karde fills the new post of director of engineering, research, and development for **Miehle-Dexter Supercharger Div.**, Miehle-Goss-Dexter Inc., Racine, Wis. He was manager of research and development, P&H Diesel Engine Div., Harnischfeger Corp.

James R. Allen was made Detroit district manager, **Wallingford Steel Co.** He has opened offices at 16115 Meyers Rd.

G. F. Palmer was made assistant general sales manager, **Kaiser Aluminum & Chemical Sales Inc.**, Chicago. **S. P. Whiteside** was made assistant to the general sales manager.

William Zech was made chief engineer, turbodynamics division, **Joy Mfg. Co.**, Buffalo.

W. J. Hannon was made Chicago district sales manager for **Leschen Wire Rope Div.**, H. K. Porter Company Inc., St. Louis. **Dr. Ottilie Amminger** was made chief metallurgist.

C. P. McCormick was made Baltimore district manager for **Jervis B. Webb Co.**

Kenneth T. Rice was named manager of the Minneapolis office of **Automatic Sprinkler Corp. of America.**

At **Marquardt Aircraft Co.'s** Ogden, Utah, plant, **Mathias Klein** was named director of manufacturing; **Robert D. Harris**, factory manager.

Dr. Arnold P. Howe fills the new post of assistant to the president of **Michigan Chrome & Chemical Co.**, Detroit.

Black & Decker Mfg. Co., Towson, Md., appointed **John M. Fox** plant manager, Hampstead, Md.; **Karl B. Salanda**, director of industrial and plant engineering; **W. B. Ford Jr.**, plant manager in Towson.

Dr. E. M. Goldstein joined **Metal & Thermit Corp.**, Rahway, N. J., to head its metallurgical laboratory.

Dr. T. E. Dancy was promoted to research supervisor in the research division of **Jones & Laughlin Steel Corp.**, Pittsburgh.

W. L. Hawks was named San Francisco district sales manager, **Pacific Scientific Co.**

Walter E. Stewart joined **American Welding & Mfg. Co.**, Warren, Ohio, as manager of production engineering, a new post. He was general superintendent of Minneapolis-Moline Co.

James H. Wyres, former district manager for west coast sales, was named sales manager of **W-S Fittings Div.**, H. K. Porter Company Inc., Roselle, N. J.

DeWalt Inc., Lancaster, Pa., subsidiary of American Machine & Foundry Co., named as assistant general sales managers **Thomas E. Berry** and **C. B. Hull III. Marlin**

TENTH OF A SERIES

Customer's Report

"Four Big Reasons why single stack furnaces are easier, faster and less expensive to install"

"The Single Stack Furnace has four major advantages, installationwise," a Director of Purchasing for a large steel producer told us when asked his views. "First, and important in this day of high construction costs, we were able to use a ❶ lighter, smaller building for a given tonnage because the Single Stack equipment does not require nearly as heavy a crane or handling equipment ❷, and ❸ it needs less space both productionwise and storagewise. Finally, this lighter equipment does not require heavy substructures. In our case, by utilizing the portable base, the substructure consisted only of ❹ a simple network of shallow trenches."

There are many other reasons why the Lee Wilson Single Stack is today the industry's preferred annealing method. When next you're considering annealing, be sure to talk with a Lee Wilson engineer.

Only Lee Wilson Furnaces Give You All These Advantages

1. GREATER FLEXIBILITY
2. MORE UNIFORM HEAT APPLICATION
3. IMPROVED CUSTOMER SERVICE
4. HIGHER PRODUCTION
5. BETTER LOAD FACTOR
6. MINIMUM PROCESS INVENTORY
7. REDUCED LABOR COST
8. BETTER OPERATING CONDITIONS
9. LOWER MAINTENANCE COST
10. REDUCED INSTALLATION COSTS

Lee Wilson* **ENGINEERING COMPANY, INC.**

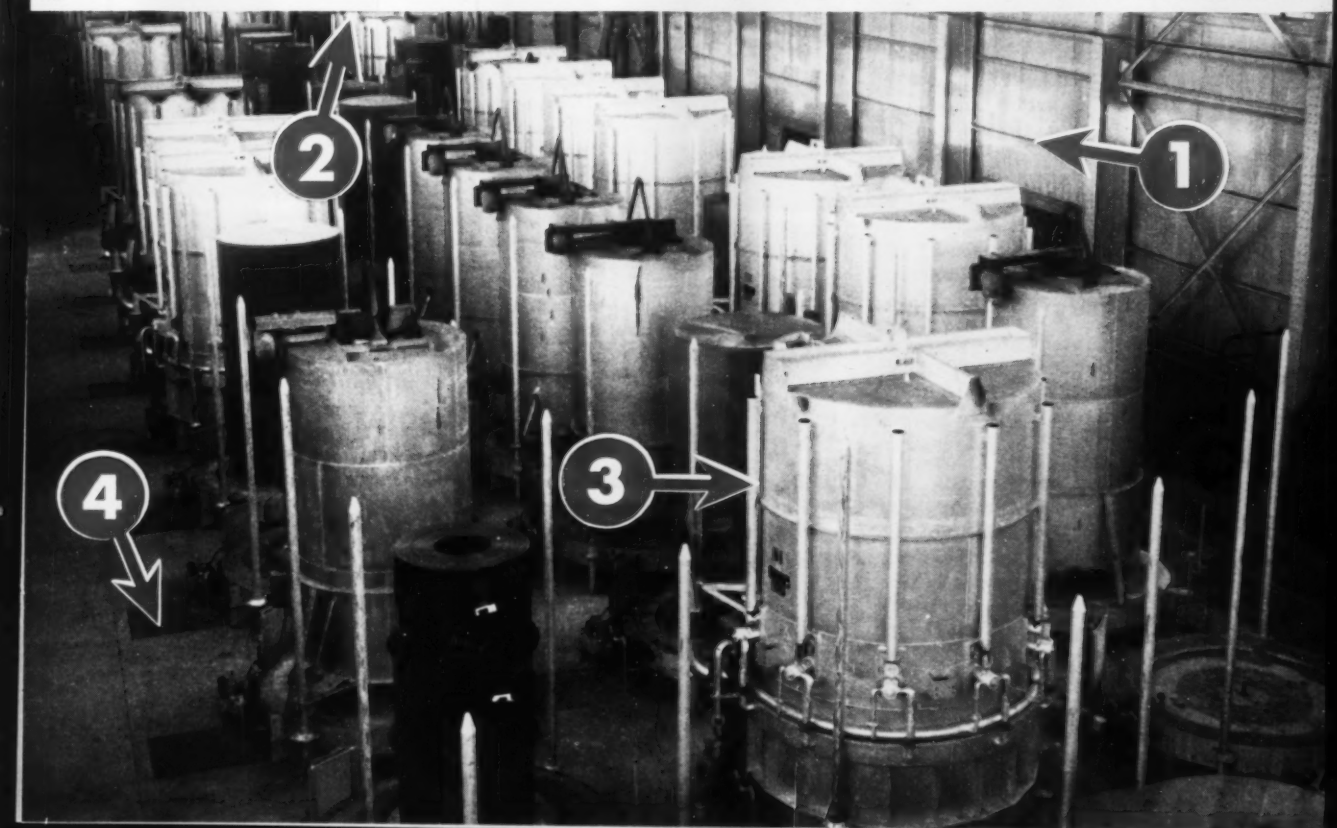
20005 WEST LAKE ROAD • CLEVELAND 16, OHIO

SINGLE-STACK RADIANT TUBE ANNEALING FURNACES

MAKE THE BEST METALS BETTER

496

* ORIGINATORS AND LEADING PRODUCERS OF SINGLE-STACK RADIANT TUBE FURNACES



GEORGE F. BURDITT
Wheelabrator sales post

JACK J. BEGLEY
Great American Industries post

TOM M. GIRDLER JR.
Union Drawn Steel mgr.

R. Boyer was made sales promotion manager.

George F. Burditt was made manager, steel mill equipment sales division, **Wheelabrator Corp.**, Mishawaka, Ind. He was district sales manager, Pittsburgh, and is replaced by **Joseph F. Underway**, previously district manager, St. Louis. **John B. Booth** was made sales engineer, Los Angeles office. **Francis E. Noyes** was made district sales manager, St. Louis; **William A. Illsley**, district sales manager, Cincinnati.

Jack J. Begley was made vice president, **Great American Industries Inc.**, and general manager of **Colson Corp.'s** new plant at Jonesboro, Ark. He joined Colson, subsidiary of Great American, in 1955, and was recently made vice president-manufacturing.

Carl H. Vaupel was elected vice president and general manager, **Aldrich Pump Co.**, Allentown, Pa. He succeeds **G. Donald Ruhe**, retired. Mr. Vaupel was resident manager of Cooper-Bessemer Corp. in Grove City, Pa.

Hunter Spring Co., Lansdale, Pa., appointed **Stanley L. Albright** to the new post of manager of product planning.

John Lindberg was named manager of the Canton, Ohio, division of **E. W. Bliss Co.** He succeeds **Richard Y. Moss**, who was made manager of special product sales. **Charles E. Peterson**, chief metallurgist of the Mackintosh-Hemphill Div., Pittsburgh, succeeds Mr. Lindberg as manager of manufacturing for the division.

Tom M. Girdler Jr. was appointed manager, **Union Drawn Steel Div.**, Republic Steel Corp., Massillon, Ohio. Former assistant manager, he succeeds **D. D. Buchanan**, retired. **H. B. Anderson**, superintendent of the Beaver Falls, Pa., plant, was named to succeed Mr. Girdler. **E. L. McReynolds** was named an assistant manager of sales.

A. P. Goohs was promoted from assistant general works manager to plant manager, **Thew Shovel Co.**, Lorain, Ohio. He is in charge of production for all Thew plants.

G. J. Burgess was made product sales manager, fuel division, **Parker Aircraft Co.**, Los Angeles.

Roy E. Hum was made superintendent of maintenance, Brier Hill Works, **Youngstown Sheet & Tube Co.**, Youngstown. **W. G. McCollum** was made assistant superintendent-maintenance.

Donald A. Sandstedt joined **Michigan-Standard Alloy Casting Co.** and **Misco Fabricators**, divisions of Michigan Industries Co., as manager of sales for Chicago, Milwaukee, and Wisconsin. He is at Chicago.

William F. Kamsler was appointed product line sales supervisor, systems division, **Beckman Instruments Inc.**, Anaheim, Calif.

Dr. L. I. Dana was appointed vice president - research and development; **David Swan**, director of research, **Linde Co.**, division of Union Carbide Corp., New York.

OBITUARIES...

J. J. Kohl, 67, founder and chairman, **International Tool Co.**, Dayton, Ohio, died Sept. 18.

G. Stewart Crane, 69, chairman, **Cutler-Hammer Inc.**, Milwaukee, died Sept. 28.

Francis J. Kearns, 48, vice president - manufacturing, **Bridgeport Brass Co.**, Bridgeport, Conn., died Sept. 24.

Henry S. Rowland, a special representative for **Bridgeport Brass Co.** in Pittsburgh, died Sept. 23.

William J. Purcell, vice president and general manager, **Munson Mill Machine Co. Inc.**, Utica, N. Y., died Sept. 14.

Philip J. Wenz, 63, manager, service and repair division, **De Laval Steam Turbine Co.**, Trenton, N. J., died Sept. 11.

Walter H. Van Buren, 51, assistant general sales manager, **Quaker Rubber Div.**, H. K. Porter Company Inc., Philadelphia, died Sept. 21.

David P. Brannin, 69, retired western district sales manager, **New Jersey Zinc Co.**, New York, died Sept. 19.

Theodore E. Mueller, 72, retired president and chairman, **American Radiator & Standard Sanitary Corp.**, died in Louisville, Ky., Sept. 24.

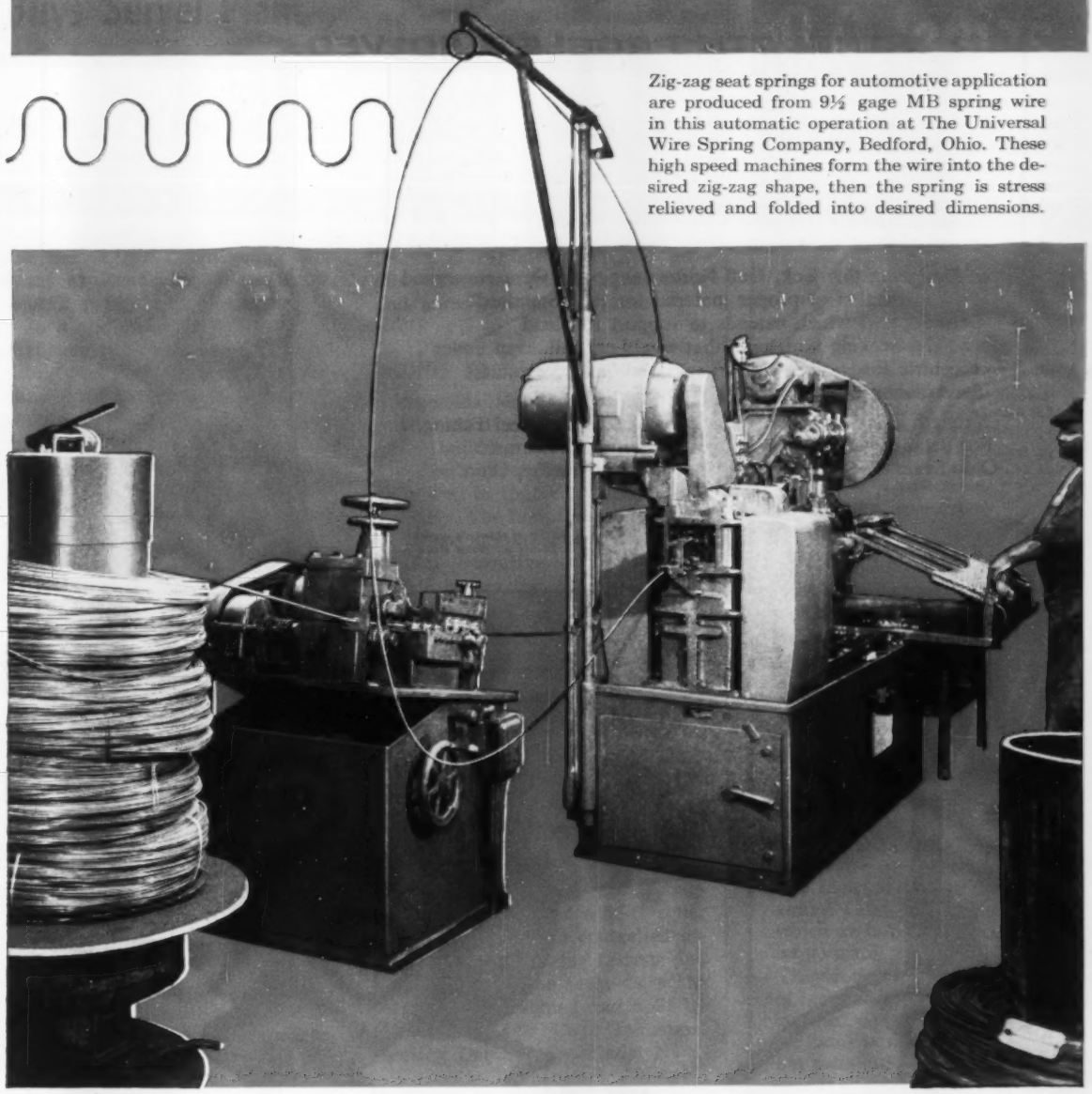
Henry W. Dotzenroth, 57, director of purchasing, **Arcos Corp.**, Philadelphia, died Sept. 19.

William C. Fork, 67, retired vice president, **Acme Steel Co.**, died Sept. 19 in Tucson, Ariz.

Herbert A. Davies, 69, former vice president at Birmingham for **American Bridge Div.**, U. S. Steel Corp., died recently at Roanoke, Va.

Robert T. Hansen, 45, general office manager, **Peden Iron & Steel Co.**, Houston, died Sept. 18.

Abraham Starr, 70, vice president-metals division, **Michael Flynn Mfg. Co.**, Philadelphia, died recently.



Zig-zag seat springs for automotive application are produced from 9½ gage MB spring wire in this automatic operation at The Universal Wire Spring Company, Bedford, Ohio. These high speed machines form the wire into the desired zig-zag shape, then the spring is stress relieved and folded into desired dimensions.

AUTOMATIC production requires AUTOMATIC quality of

J&L SPRING WIRE

Every coil of J&L spring wire is thoroughly tested for uniformity of physical and dimensional properties. This uniformity of J&L's famous Mastercraft, hard-drawn MB or Electromatic oil-tempered MB spring wire speeds production, reduces rejects, in automatic operations.

J&L exercises rigid quality control in every phase of production from ore mine to finished product. J&L wire is tops in quality . . . competitive in price.

Call your J&L representative the next time you order spring wire. Or write direct to the Jones & Laughlin Steel Corporation, Dept. 404, 3 Gateway Center, Pittsburgh 30, Pennsylvania.

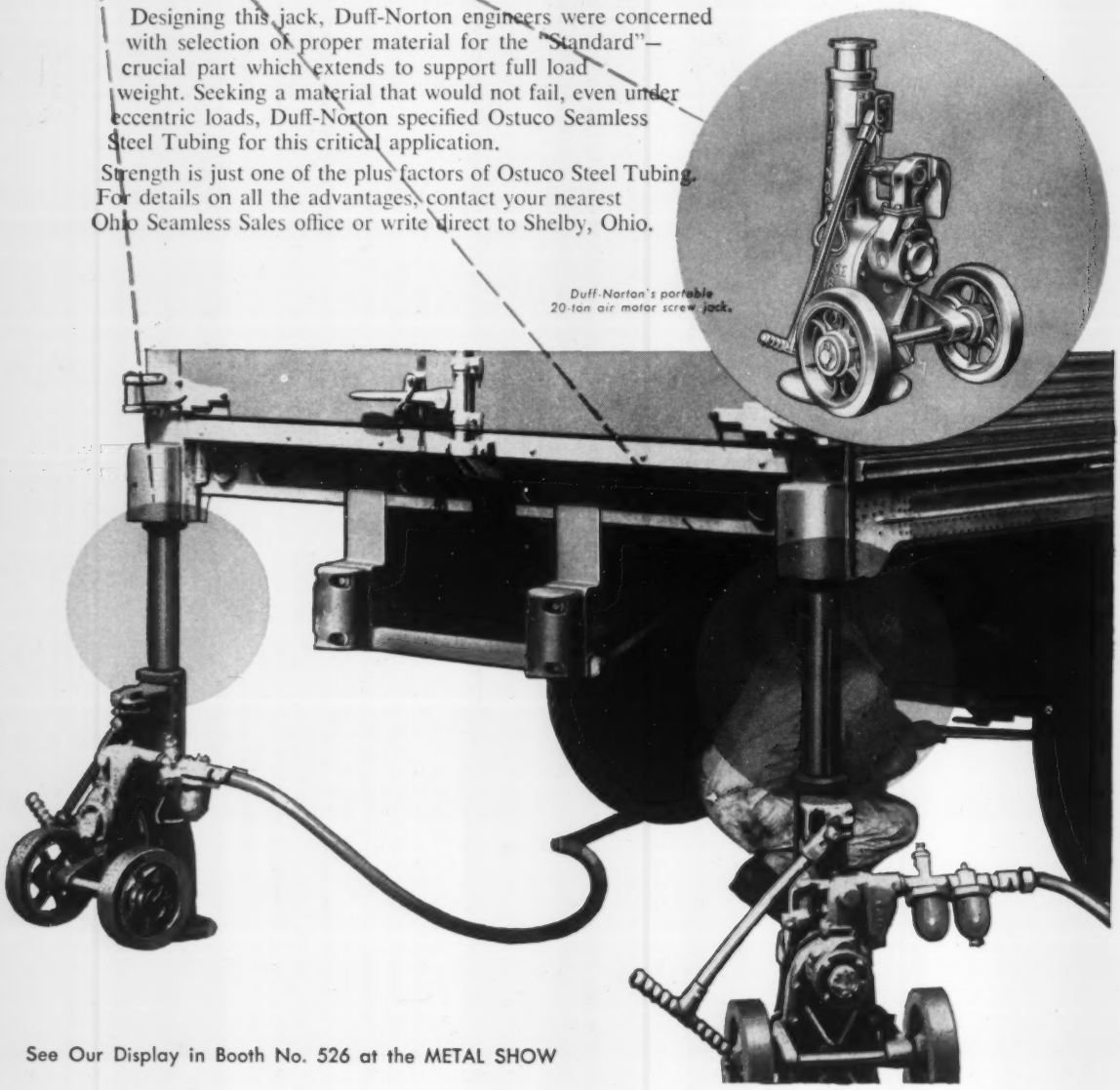
Jones & Laughlin STEEL
. . . a great name in steel

STRENGTH PROBLEM SOLVED with Ostuco Steel Tubing

Duff-Norton Company, Pittsburgh, manufactures a portable 20-ton air motor screw jack now finding wide acceptance as a maintenance tool by the trucking industry because of its versatility, dependability, and rugged strength.

Designing this jack, Duff-Norton engineers were concerned with selection of proper material for the "Standard"—crucial part which extends to support full load weight. Seeking a material that would not fail, even under eccentric loads, Duff-Norton specified Ostuco Seamless Steel Tubing for this critical application.

Strength is just one of the plus factors of Ostuco Steel Tubing. For details on all the advantages, contact your nearest Ohio Seamless Sales office or write direct to Shelby, Ohio.



Duff-Norton's portable 20-ton air motor screw jack.

See Our Display in Booth No. 526 at the METAL SHOW

OSTUCO TUBING

MANUFACTURED IN
SHELBY, OHIO
EXCLUSIVELY BY

OHIO SEAMLESS TUBE DIVISION
OF COPPERWELD STEEL COMPANY

SHELBY, OHIO • Birthplace of the Seamless Steel Tube Industry in America
SEAMLESS AND ELECTRIC-RESISTANCE WELDED
STEEL TUBING • FABRICATING • FORGING

SALES OFFICES: Birmingham • Charlotte • Chicago (Oak Park) Cleveland • Dayton • Denver • Detroit (Ferndale) • Houston Los Angeles (Lynwood) • Moline • New York • North Kansas City • Philadelphia (Wynnewood) • Pittsburgh • Richmond Rochester • Salt Lake City • Seattle • St. Louis • St. Paul St. Petersburg • Tulsa • Wichita
CANADA: Railway & Power Engr. Corp., Ltd.
EXPORT: COPPERWELD STEEL INTERNATIONAL COMPANY, 225 Broadway, New York 7, New York

Buys Servel Plant

Subsidiary of Arkansas Louisiana Gas Co. will make gas air conditioning units in Evansville, Ind.

ARKLA Air Conditioning Corp., a subsidiary of Arkansas Louisiana Gas Co., Shreveport, La., has assumed ownership and operation of the Servel Air Conditioning Div. plant at Evansville, Ind. (STEEL, Sept. 2, p. 99)

In a statement of policy, W. R. Stephens, chairman, and J. C. Hamilton, president of the new company, said the firm is exclusively in the gas air conditioning business and "will produce the 3½ and 5-ton gas air conditioners for domestic use and the 25-ton water chiller for commercial and industrial applications."

A department of research and development is being established at Evansville.

Will Close Burt Foundry

Electric Auto-Lite Co. will close its Burt Foundry Div., Toledo, Ohio. F. M. Wistert, vice president, says the step is being taken because the foundry is obsolete and "outside firms can supply Auto-Lite with castings at a price lower than the cost of producing them in the old foundry."

Buys Interest in Poroloy

Bendix Aviation Corp., Detroit, purchased National-Standard Co.'s (Niles, Mich.) stock interest in Poroloy Equipment Inc., Van Nuys, Calif. Poroloy makes a porous stainless steel product which has found useful applications in meeting "heat barrier" and filtration problems in guided missiles, jet engines, and other applications.

Enters Vacuum Metallurgy

Newest entry in vacuum metallurgy is Allvac Metals Co. which has started operations of its 8000 sq-ft plant at Monroe, N. C. The firm plans to specialize in the production of vacuum melted alloys for high temperature applications. Equipment includes an induction heated vacuum melting furnace (capacity: 1000 lb) built by F. J. Stokes Corp., Philadelphia. Rolling mills, which will enable the company to offer fabricated products to its customers, will be ready for operation before the end of this year.

Enters Ultrasonic Field

Narda Microwave Corp., Mineola, N. Y., formed a subsidiary, Narda Ultrasonics Corp., to produce ultrasonic cleaning machines and metalworking equipment.

Builds in Richmond, Va.

Reynolds Metals Co. will build a $6-million research center and office building in Richmond, Va. The firm's general sales offices will be moved to that city from Louisville, Ky. The facilities will be built on a site adjoining Reynolds' $11-million executive office building which is nearing completion.

Reynolds and Tube Investments Ltd. of England organized Reynolds Metals & T. I. Aluminium Ltd. to take over the facilities of Tube Investments' Aluminium Div. Facilities include a rolling mill in South Wales and an extrusion plant near Birmingham, England.

Installs Sintering Furnace

United States Graphite Co., a division of the Wickes Corp., Saginaw, Mich., installed a 56-ft roller hearth furnace with controlled atmosphere for sintering ferrous and nonferrous powder briquets. The furnace was designed and built by General Electric Co.'s Industrial Heating Dept., Schenectady, N. Y.

Imperial Brass Moving

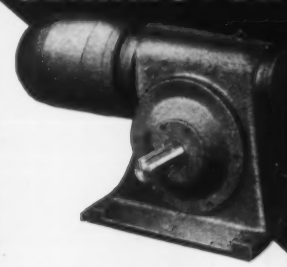
Imperial Brass Mfg. Co., Chicago, has placed in operation a completely integrated tube fitting and tube tool manufacturing facility at Niles, Ill. The new structure will house the company's executive and sales offices as well as all of its manufacturing facilities. The move will be completed by Oct. 30.

Electronics Firm Expands

CG Electronics Corp. acquired a machine shop in Albuquerque, N. Mex., quintupling its former

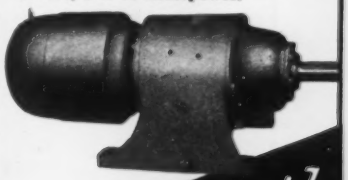
(*Please turn to Page* 150)

D.O.James GEARMOTORS



RIGHT ANGLE GEARMOTOR — Horizontal or Vertical Drive, 8 sizes, ratio 6:1 to 100:1, ⅓ to 30 horsepower.

IN-LINE GEARMOTOR — Horizontal or Vertical Drive, 37 sizes, ratio 9.2:1 to 1200:1, 1 to 75 horsepower.



OUR 70th YEAR

THE D.O.James Gearmotors are of the same construction and high quality as the individual Gear Speed Reducers which we have been producing for so many years.

They cover a very wide range of ratios, horsepowers, and are an ideal, compact, efficient unit for many power and space-saving installations. They are designed and built by an organization that has been engaged in the manufacture of Gears for 70 years and that has successfully pioneered the Gear Speed Reducer to its present-day high standards.

D.O. JAMES
GEAR MANUFACTURING CO.
1140 W. Monroe Street, Chicago, Illinois

Since 1888

MAKERS OF EVERY TYPE OF GEAR AND GEAR SPEED REDUCER

SEND FOR CATALOGS

Catalogs, price lists and selection tables covering gear speed reducers and gearmotor speed reducers are available to power transmission engineers. Please request on company Letterhead — we'll mail your copy at once.

Westinghouse offers: the only self-adjusting

D-C magnetic brake

Simplicity of construction— minimum number of parts means years of trouble-free operation

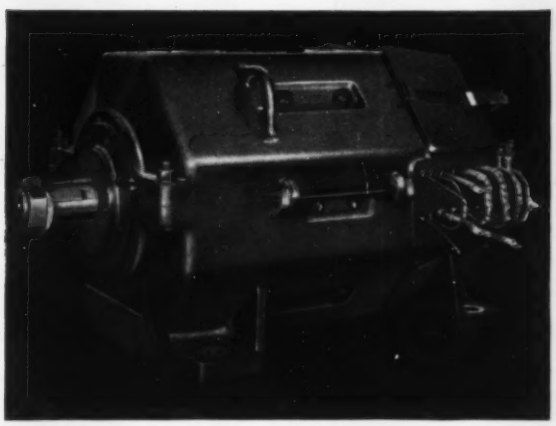
Now, brake adjustment problems are gone forever. With Westinghouse exclusive self-adjusting d-c magnetic brakes, the need for adjustment is eliminated—for the life of the brake lining.

Regardless of lining wear—or wheel expansion—the SA brake shoe is always in correct adjustment and proper alignment.

Field tests show self-alignment of SA brakes permits even lining wear—shoe tips cannot drag. Lining life is increased up to 50%. Wheel wear and scoring are minimized for longer wheel life.

For complete information on industry's most advanced d-c magnetic brake, call your WESTINGHOUSE sales engineer. Or, write Westinghouse Electric Corporation, 3 Gateway Center, P.O. Box 868, Pittsburgh 30, Pennsylvania. Ask for B-6547. J-22048

YOU CAN BE SURE...IF IT'S Westinghouse



Westinghouse mill motors with silicone insulation

are giving top performance on the toughest applications. Silicone insulation plus greater capacity and cooler operation of improved field coil design . . . heavy-duty shaft, bearing and housing design to take high torque loads . . . give you longer, more dependable motor life with Westinghouse Hevi-duty Mill Motors. For all the details, ask for B-6547.

Two tough paint stripping jobs made easy

New!
OAKITE STRIPPER No. 110

... safely strips zinc chromate primers

Zinc chromate primers on aluminum are dragged loose with no etching of the metal by Stripper No. 110. Users report it the best ever for this job.

In a typical demonstration, parts topped with two baked enamel coats over the primer emerged bare and clean after a 5-minute soak and hot rinse.

New!
OAKITE STRIPPER SA

... strips even epoxy coatings fast

Epoxy as well as other resistant finishes are quickly conquered by Oakite Stripper SA. Put to the test on coated steel tapes, it stripped the epoxy finish in less than 2 minutes.

It thoroughly strips organic coatings from *anodized* aluminum, too. Safe for steel, aluminum, copper and brass.

Technical Service Representatives in Principal Cities of U. S. and Canada

Paint research strives to give coatings *longer* life. Oakite research keeps pace with strippers to cut short this life on rejects. If you have a stripping problem, see what savings in time and work Oakite Strippers offer you. Send for Bulletin. Oakite Products, Inc., 34E Rector Street, New York 6, N. Y.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS · METHODS · SERVICE
SCIENCE

Export Division Cable Address: Oakite

(*Concluded from Page* 147)

manufacturing space. The expansion will principally affect its electroplating and printed circuit activities. The firm makes radio control equipment and is a subsidiary of Gulton Industries Inc., Metuchen, N. J.

Orders Sheet, Strip Mill

A $550,000 sheet and strip mill for rolling copper and its alloys has been ordered by Nacional de Cobre S. A., Mexico City, Mexico, from Loewy-Hydropress Div. (New York) of the Baldwin-Lima-Hamilton Corp., Philadelphia. The equipment is part of a $3-million installation. Construction of the plant is scheduled for completion late in 1958.

Futurmill Sells Rights

Futurmill Inc., Pontiac, Mich., sold manufacturing rights for its structural milling machine to Baldwin - Lima - Hamilton Corp., Philadelphia. Exclusive sales distribution of the Baldwin-Futurmill will be retained by the Pontiac firm.

Burrell To Expand

Burrell Corp., Pittsburgh, plans to expand its research and development laboratories and manufacturing facilities for scientific instruments and laboratory supplies. Additional floor space has been leased in a building adjoining the company's upper Fifth Avenue location.

Buys Magic Chef Line

Cribben & Sexton Co., Chicago, purchased the commercial range business of Magic Chef Inc., Cleveland. The purchase includes tools, dies, special machinery, patent rights, and inventories of raw materials.

Allen Mfg. Building Plant

Allen Mfg. Co. is erecting a main office and manufacturing plant at Bloomfield, Conn. It will replace the firm's buildings at Hartford, Conn., and will be used for production of setscrews and hex wrenches. Walter Kidde Con-

View through door of a press forge furnace showing B&W Insulating Firebrick walls and arches and B&W 80 Firebrick floor. The burners and flues are visible on the back wall.

B&W Insulating Firebrick reduce fuel costs 15% and increase production

Experience paid off for this major steel producer. Aware of the benefits of B&W Insulating Firebrick in his drop forge furnaces, he built two new press forge furnaces with lightweight B&W IFB linings. The results were a minimum average fuel saving of 15% *and* increased production, since the entire heating process for certain grades of steel could now be accomplished in one operation. Here's why.

The lightweight and consequent low heat storage of B&W IFB linings keep the furnace walls at a uniform temperature to provide the most efficient heating conditions. Unlike heavier constructions, B&W Insulating Firebrick linings attain a uniform temperature faster with less fuel consumption.

In addition, B&W IFB linings respond quicker to temperature changes, permitting more accurate temperature control. In this instance, this not only prevented the cracking of tool and stainless steels, but helped reduce the total heating cycle, increasing production.

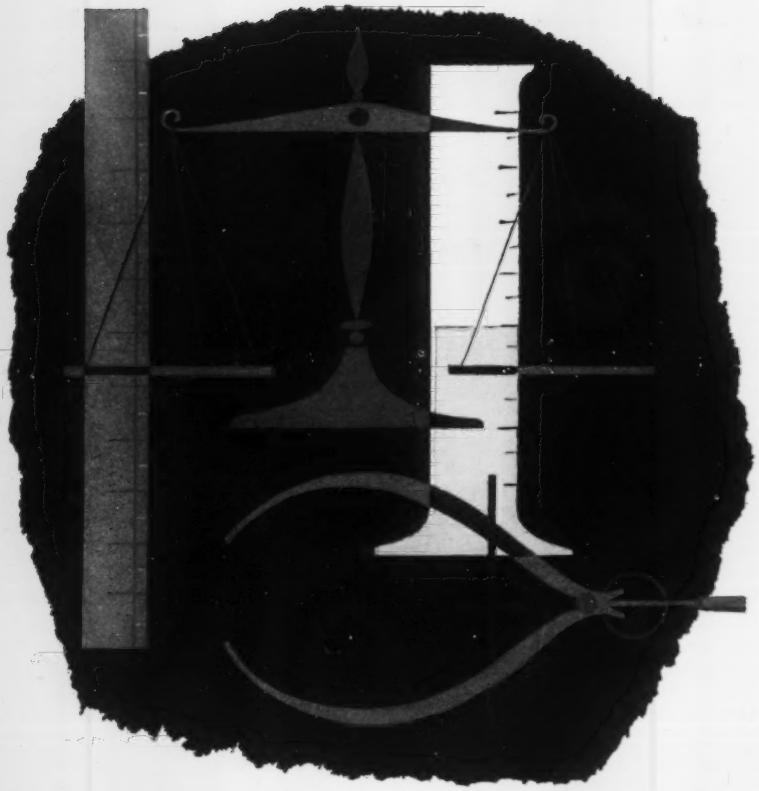
These forging furnaces use a 9" B&W K-30 IFB wall backed up by B&W K-20 IFB. The K-30 is used as face brick because of its high temperature resistance. The K-20 is used as a backing because of its high insulating value. The hearth floor is of B&W 80 Firebrick for abrasion resistance and resistance against attack by millscale at the temperatures involved. Door linings are of B&W Kaocast and B&W Kaolite.

R-583

B&W REFRACTORIES PRODUCTS: B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick • B&W Insulating Firebrick • B&W Refractory Castables, Plastics, and Mortars • B&W Silicon Carbide • B&W Ramming Mixes

BABCOCK & WILCOX

THE BABCOCK & WILCOX CO.
REFRACTORIES DIVISION
GENERAL OFFICES: 161 EAST 42nd ST., NEW YORK 17, N.Y.
WORKS: AUGUSTA, GA.



how do you measure economy?

economy is not measured by price alone!

PROVED OVER THE YEARS

When you are concerned with metal abrasives there are many yardsticks that must be applied to truly measure economy.

How long will an abrasive last? How long before it breaks down into fines and becomes inefficient?

How destructive is the abrasive to machinery and equipment?

How efficiently does it perform and what is the time cycle for good performance?

To sum it all up — the economy of using any abrasive can be measured by the **cost per ton of metal cleaned!**

On every count, Malleabrasive has proved its superiority over the years in hundreds of plants.

If you want to improve the economy of your blast cleaning operations — check Malleabrasive.

MALLEABRASIVE

THE GLOBE STEEL ABRASIVE CO., MANSFIELD, OHIO ®

1907—Fiftieth Anniversary—1957

structors Inc., New York, in charge of construction, says the project is scheduled for completion in August, 1958.

ASSOCIATIONS

R. S. Stevenson, Allis-Chalmers Mfg. Co., Milwaukee, was elected president of **Farm Equipment Institute**, Chicago. Other officers are: Vice presidents, Mark V. Keeler, International Harvester Co., Chicago, and Martin R. Sehm, R. Hershel Mfg. Co., Peoria, Ill.; chairman of the executive committee, G. A. Kelly II, G. A. Kelly Plow Co., Longview, Tex.

Robert E. Fleming has been elected executive vice president of the **Industrial Heating Equipment Association**, Washington, to succeed Carl L. Ipsen who retired Sept. 30.

CONSOLIDATIONS

Oglebay, Norton & Co. and several companies associated with that firm will merge, subject to approval by shareholders. The surviving corporation, Oglebay Norton Co., would be formed by merger of these companies: **Oglebay, Norton & Co., Montreal Mining Co., Columbia Transportation Co., Ferro Engineering Co., Pringle Barge Line Co., Saginaw Dock & Terminal Co., Richwood Sewell Coal Co., Fairport Machine Shop Inc., North Shore Land Co., Standard Box Co.**

If approved, the merger will be effective Oct. 31. Officers will be: Honorary chairman, R. C. Norton; chairman, Courtney Burton; president, H. S. Taylor; executive vice president, E. W. Sloan Jr.; senior vice president - Transportation & Dock Div., F. R. White Jr.; senior vice president-general manager of Ferro, G. A. Peterson; vice president-assistant manager of Ferro, W. M. Charman Jr.; vice president-administration of Ferro, P. R. Ward; vice president-sales of Ferro, G. F. Eaton; vice president-vessel operations, A. B. Cozzens; vice president-coal mining, W. D. Hamilton; vice president-coal sales, A. K.

HOW LONG DOES IT TAKE YOU TO UNLOAD STEEL?

A large plant now saves $125,000 a year because Palmer-Shile engineers found out how costly man-hours spent in unloading steel could be reduced.

Use of Palmer-Shile portable heavy duty coil and bar racks with automatic tongs reduced from 80 to 3 the number of man-hours needed to unload 100,000 lbs. of steel. In addition, the stock tiered in racks was made much more accessible for greater efficiency in handling.

P-S Call in Palmer-Shile engineers to check on your materials handling methods and suggest ways to save many dollars in plant operating costs.

for Economical . . . Efficient . . . Safe HANDLING TIERING STORING SELECTING

CONSULT P-S FOR THE BEST

COIL RACKS

CONSULT P-S FOR THE BEST

BAR RACKS

DESIGNED AND MANUFACTURED BY

Palmer-Shile Co.

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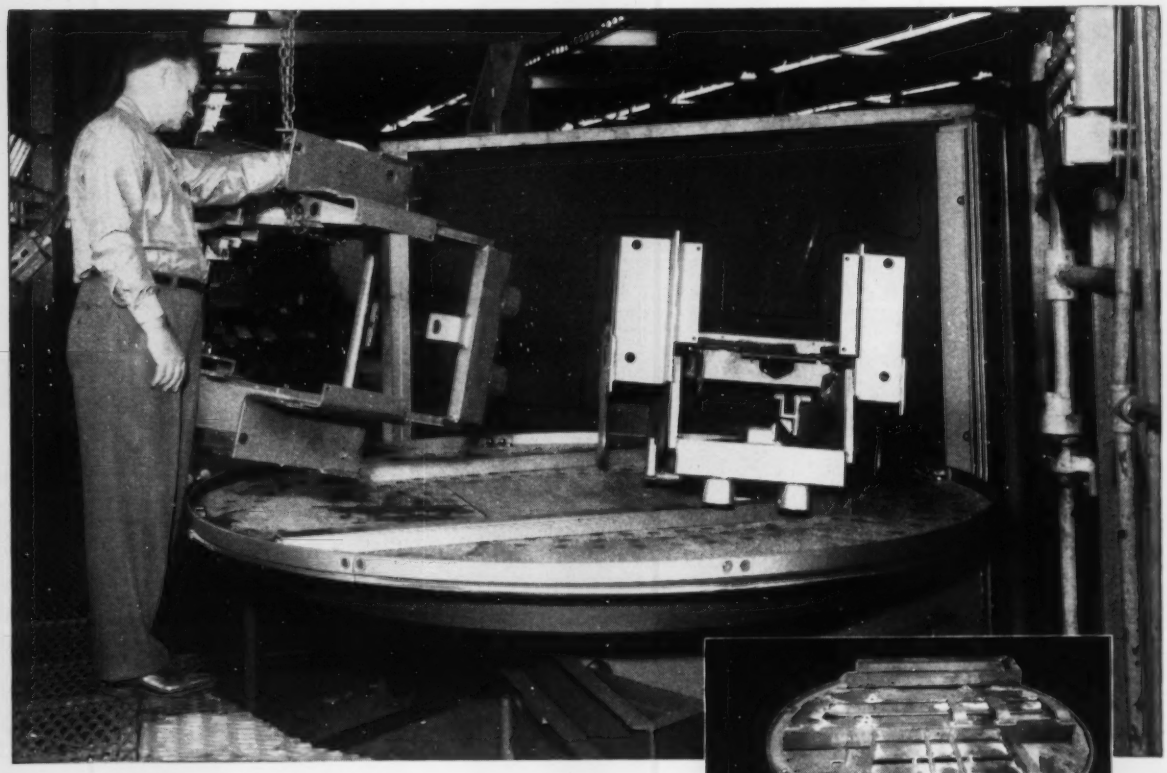
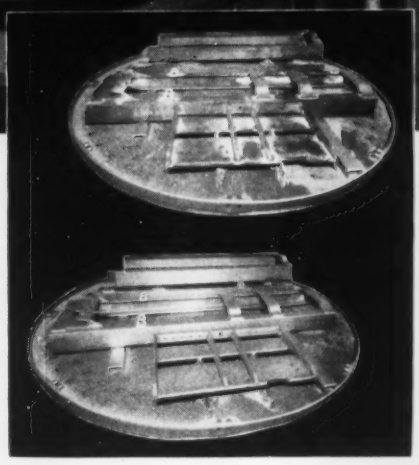
126 Dartmouth St., BOSTON 16, Mass., COmmonwealth 6-0570 • 1209 Burlingame Ave., BURLINGAME, Calif., Diamond 2-0823 • 612 N. Michigan Ave., CHICAGO 11, ILL., AUstin 7-8599 • 857 Leader Bldg., CLEVELAND 14, Ohio, SUperior 1-3235 • 3301 Walnut St., DENVER 5, Colo., ALpine 5-3984 • 202 Genesee Bank Bldg., FLINT, Michigan, CEdar 8-6881 • 2609 S. Broadway, FORT WAYNE, Indiana, KEnmore 5408 • 835 No. Capitol Ave., INDIANAPOLIS 4, Indiana, MEIrose 5-2587 • 6440 Fleet St., LOS ANGELES 22, Calif., RAymond 3-3733 • 647 W. Virginia St., MILWAUKEE 4, Wis., BRoadway 1-9860 • 5107 Columbia Ave., ST. LOUIS 9, Mo., PRospect 1-1474 • 199 Main St., WHITE PLAINS, N. Y., White Plains 6-1354.





WHEELABRATOR® opens the door to $40,000 annual savings

Slashes weldment cleaning time ½ to ⅔ for Towmotor

Wheelabrator airless abrasive blast cleaning of lift truck weldments paid for itself in less than a year at Towmotor Corp., Cleveland, by replacing manual wire brushing and sanding. Annual savings were more than $40,000.

According to the Towmotor standards departments, saving like these have been reported: Pieces that required 37 minutes for cleaning and chipping are now Wheelabrator cleaned in an average time of 12 minutes, bringing savings of $2.43 per piece. Lift truck frames formerly requiring an average of 1¼ hours for grinding, sizing and cleaning now require only 35½ minutes, bringing $3.88 savings apiece.

Besides saving time and money, Towmotor reports the Wheelabrated surface provides a superior bond for painting and adds that quality is improved because substandard welds are exposed prior to painting.

Wheelabrator airless blast cleaning is the fastest method of metal cleaning known. There is a machine available for handling all types, sizes and shapes of work. Investigate the savings you can make with the Wheelabrator.

Write today for full details on Wheelabrator airless blast cleaning. Ask for Bulletin 74C

WHEELABRATOR
CORPORATION
509 South Byrkit Street, Mishawaka, Indiana

WORLD'S LARGEST MANUFACTURER OF AIRLESS BLAST CLEANING EQUIPMENT

Greene; vice president-ore sales, A. B. Rathbone; vice president and general counsel, J. J. Dwyer; treasurer, L. H. Norton; and secretary, G. E. Guthery.

L. A. Young Spring & Wire Corp., Detroit, purchased **Link Radio Corp.**, New York, and will move the manufacturing operation to its Gonset Div. which produces electronic communications equipment in Burbank, Calif.

NEW PLANTS

Link - Belt Co., Chicago, will move into its new Los Angeles plant at 1200 Sycamore St., Montebello, Calif., over the weekend of Oct. 12. Production facilities will be moved by Nov. 15. The 90,000 sq-ft plant will more than double its manufacturing facilities in the area.

Babcock & Wilcox Co., New York, plans to build a plant costing between $30 million and $40 million at Koppel, Pa. Officials have not revealed details of its program, but reports indicate the plant may be an extension of the company's titanium facilities.

Ashland Mining Co., Ashland, Wis., will build a low-grade iron ore pellet plant near Butternut, Wis., at a cost of more than $50 million. An estimated 250 million tons of mineable ore is on land owned or leased by the firm. Preliminary engineering is underway at the Agenda mine.

Square D Co., Detroit, completed an electrical equipment assembly plant on Marietta Boulevard, Atlanta. The 31,000 sq-ft, $500,000 plant is a fully integrated assembly facility for switchboards, circuit breakers, control centers, and related devices.

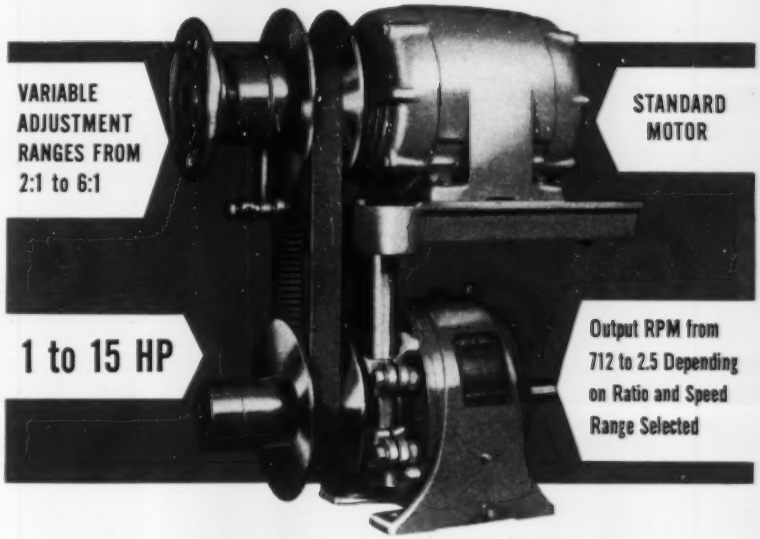
Badger Mfg. Co., Cambridge, Mass., completed its $5-million assignment for equipment design engineering and construction of a sodium borohydride plant at Danvers, Mass., for **Metal Hydrides Inc.**, Beverly, Mass. Although details are classified, it is known

(*Please turn to Page* 158)

NEW FROM FOOTE BROS.

Vari-Mount

VARIABLE SPEED MOTORIZED DRIVE


VARIABLE ADJUSTMENT RANGES FROM 2:1 to 6:1
STANDARD MOTOR
1 to 15 HP
Output RPM from 712 to 2.5 Depending on Ratio and Speed Range Selected

VARI-MOUNT—the new Variable Speed Motorized Drive offers infinitely variable speed selection, greater flexibility of operation, wide adaptability, easier maintenance and the sound design you expect from Foote Bros.

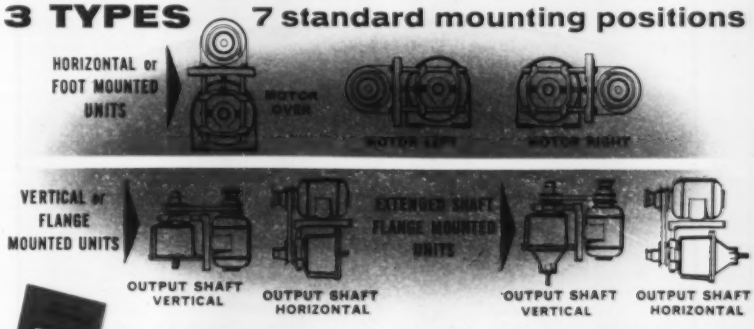
With a Vari-Mount, you can use your own motor—old or new NEMA Standard—or, the unit can be supplied with any standard motor of your choice. The Vari-Mount Reducer incorporates Duti-Rated Lifetime Gearing with file-hard tooth surfaces and tough, ductile cores for maximum life and efficiency.

Positive handwheel control of the adjustable pulley permits pin-point accuracy in speed selection over the entire range. Vari-Mount Units may be equipped with Remote or Automatic speed selection devices if required.

Spring loaded, self-centering Variable Pulley and close-coupled in line design insures permanent belt alignment, smoother performance, and minimum overhung load on motor bearing. No thrust load is imposed on motor bearings at any speed or during speed changes.

Quick belt changes made possible by the wide-open design of the Vari-Mount, together with easily accessible lubrication fittings make maintenance an easy matter.

3 TYPES 7 standard mounting positions



Want complete details?...Write for Vari-Mount Catalog today

this trademark stands for the finest industrial gearing made

FOOTE BROS. Duti-Rated LIFETIME GEARING

T. M. REG. U. S. PAT. OFF

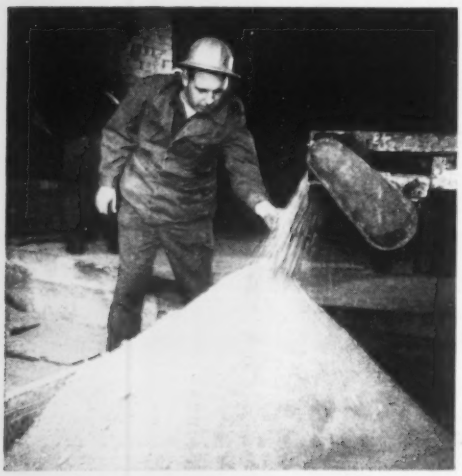
FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION

4583 SOUTH WESTERN BOULEVARD · CHICAGO 9, ILLINOIS

UNITED STATES STEEL CORPORATION—with a successful six-year experience using Permanente 165—adds another Permanente 165 bottom at #5 Open Hearth Shop, Homestead Works.



EACH BATCH of Permanente 165 Ramming Mix is checked for correct moisture content by a Kaiser Chemicals' Technician.

U. S. STEEL INSTALLS

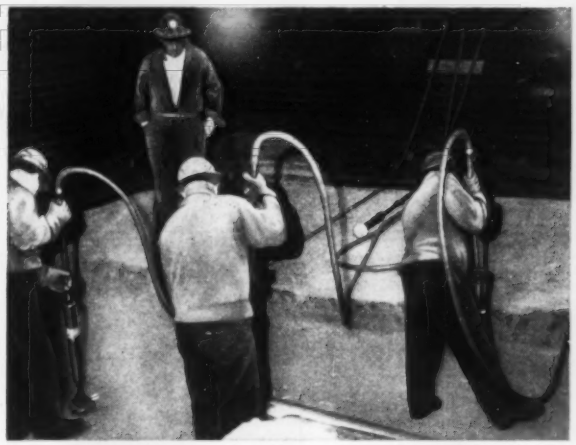
This Permanente 165 bottom is the 91st for United States Steel Corporation . . . and at #5 Open Hearth Shop, Homestead Works, it becomes the *tenth* furnace with a 165 bottom out of eleven furnaces on the line.

There is a good reason why U. S. Steel is using more and more 165 for furnace bottoms.

Experience has *proved* that it lasts significantly longer than other materials . . . that it requires fewer repairs and less down time . . . that it helps produce greater tonnage at lower bottom cost!

One of the reasons for this performance is Permanente 165's complete resistance to hydration under the most severe conditions. Another is its remarkable resistance to attack by iron oxide and slag. And still another is its installed high density—averages 175 lbs. per cubic foot *in the bottom where density means longer life.* Permanente

RAMMERS COMPACT 165 against back wall as furnace bottom nears completion. When on line again, furnace will produce 300 tons of steel per heat.



CAREFUL RAMMING assures dense monolithic bottom after burn-in with more pounds of MgO per cubic foot (165 lbs.) than any other ramming mix.

IN PRODUCTION this new tap hole lasted 108 heats before repiping. Sub hearth shown here plus other portions of furnace were built of Kaiser Periclase Brick.

ITS 91st PERMANENTE 165 BOTTOM

165 is made from high purity Kaiser Periclase refractory grains, 94-96% MgO. And because it ceramically bonds itself into a crystalline mass at relatively low temperatures, you get a tough, dense homogeneous bottom fast.

A new, completely revised 28-page manual, "Suggested Methods of Installing Permanente 165 and 84 Ramming Mixes," gives complete details. Send for your free copy.

Call or write Kaiser Chemicals Division, Dept. R7252, KAISER ALUMINUM & CHEMICAL SALES, INC., at any of the regional offices listed below.

PITTSBURGH 22, PA. . . . 3 Gateway Center
HAMMOND, IND. . . . 518 Calumet Building
OAKLAND 12, CALIF. . . . . 1924 Broadway

Kaiser Chemicals

Pioneers in Modern Basic Refractories

REFRACTORY BRICK & RAMMING MATERIALS • CASTABLES & MORTARS • MAGNESITE • PERICLASE • DEADBURNED DOLOMITE • ALUMINAS

IN CRANE SERVICE...

DEPENDABILITY MEANS EVERYTHING

Everything in "Shaw-Box" Cranes is designed and built to assure complete dependability in the severest services. Industrial plants of every size and description acknowledge the outstanding performance of "Shaw-Box" Cranes. For these rugged cranes have construction and operational advantages that keep power consumption and maintenance costs low — features that completely safeguard man, load and crane.

"Shaw-Box" creative engineering has been responsible for developing many new concepts in overhead cranes that are now recognized as standard in specifications all over the world. Out of this continuing research are coming even greater advances to keep pace with the needs of industry in the years ahead.

Whether your plant requires a small heavy-duty crane or one whose capacity is 300 tons or more, you can be sure of plus value for every dollar you invest in a "Shaw-Box" Crane. We manufacture the most complete line available anywhere and will gladly help you select the type and size that will assure the utmost in dependability and economy. *Write for Catalog 219.*

56E-4R

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

'Load Lifter'® CRANES

MANNING MAXWELL & MOORE, INC.
SHAW-BOX CRANE & HOIST DIVISION
384 West Broadway • Muskegon, Michigan

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialities. Other Divisions produce 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

In Canada: Manning, Maxwell & Moore of Canada, Ltd., Avenue Road, Galt, Ontario.

(*Concluded from Page* 155)

that the output will go into the formulation of high-energy fuels under the terms of a Navy contract.

Peterson Steels Inc., Union, N. J., opened a warehouse at 2040 Indian Boundary Dr., Melrose Park, Ill. The company has consolidated its Chicago sales office with the new warehouse. Peterson markets alloy bearing steel bars and tubing known as SAE 52100. It also supplies steel forgings in all analyses, and imports Swedish steel in various forms.

Central Screw Co., Chicago, opened an 80,000 sq-ft plant at Frankfort, Ky. The company also has awarded contracts for construction of a plant in Los Angeles which will triple present facilities.

Eberhard Faber Pencil Co. moved into its multimillion dollar plant at Crestwood (Wilkes-Barre), Pa. Its products will include writing instruments for marking white-hot metals.

NEW ADDRESSES

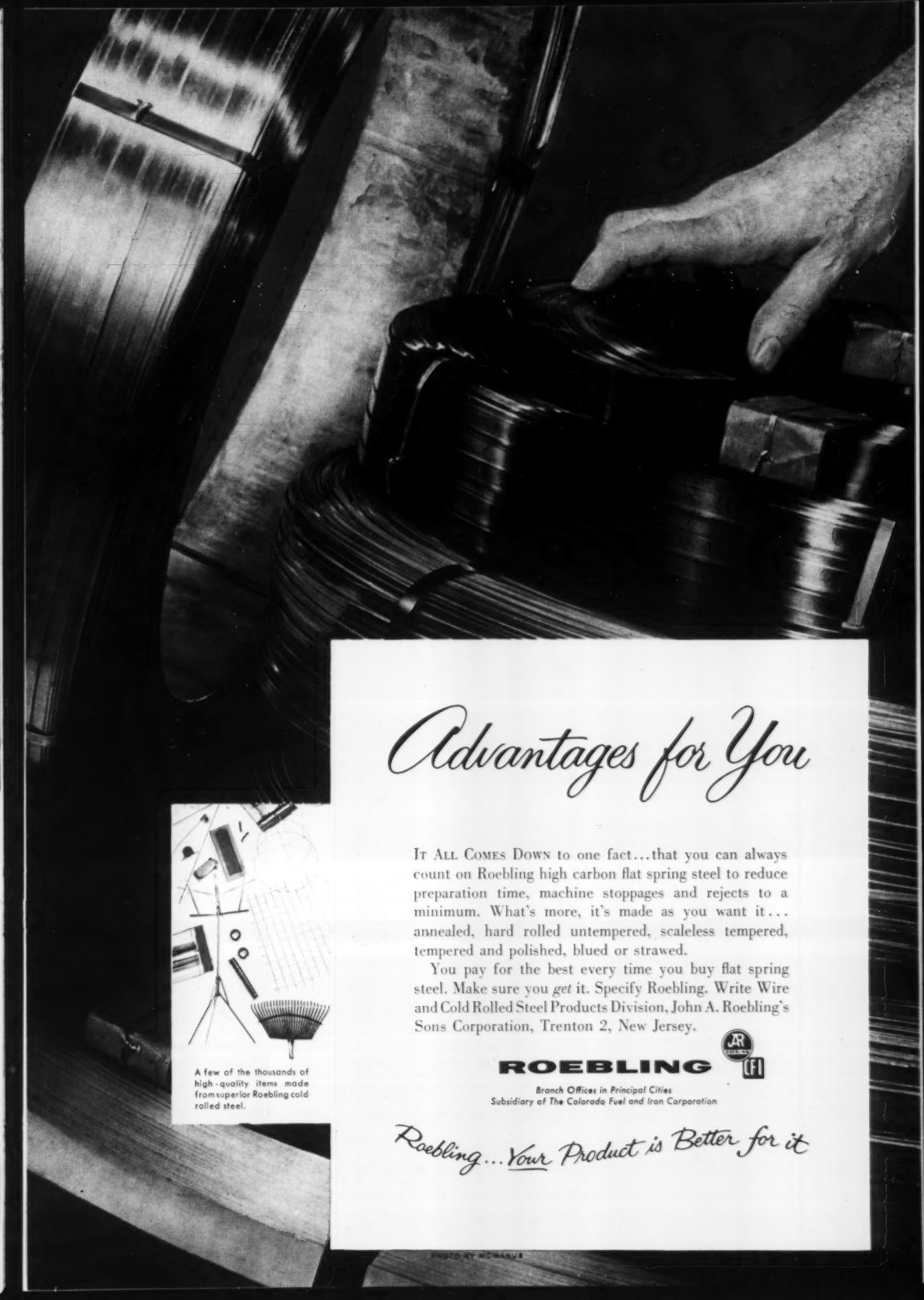
Pruett Machine & Engineering Co. moved to expanded quarters at 613 N. Commercial Ave., Covina, Calif. The firm makes screen strainer and filter assemblies for the aircraft industry and pipe concerns.

NEW OFFICES

Landis Tool Co., Waynesboro, Pa., maker of precision cylindrical grinders, opened a sales office at 15 N. Main St., Centerville, Ohio.

Fairbanks Co., New York, manufacturer of bronze and iron body valves, casters, hand trucks, and wheels, opened a branch office and warehouse at 2600 S. Troop St., Chicago.

Trane Co., La Crosse, Wis., opened suboffices at 3221 S. Calhoun St., Ft. Wayne, Ind., and at San Diego.



Advantages for You

IT ALL COMES DOWN to one fact...that you can always count on Roebling high carbon flat spring steel to reduce preparation time, machine stoppages and rejects to a minimum. What's more, it's made as you want it... annealed, hard rolled untempered, scaleless tempered, tempered and polished, blued or strawed.

You pay for the best every time you buy flat spring steel. Make sure you *get* it. Specify Roebling. Write Wire and Cold Rolled Steel Products Division, John A. Roebling's Sons Corporation, Trenton 2, New Jersey.

A few of the thousands of high-quality items made from superior Roebling cold rolled steel.

ROEBLING

Branch Offices in Principal Cities
Subsidiary of The Colorado Fuel and Iron Corporation

Roebling... Your Product is Better for it

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FORGINGS for...
the Jet-Missile Age
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KEY TO FORGINGS ILLUSTRATED
1. Jet Engine Pad — Titanium — 11 lbs. —17 inches.
2. Jet Engine Vane — Titanium — 27 lbs. — 15 inches.
3. Aircraft Support — Aluminum — 20 lbs. — 49 inches.
4. Aircraft Fitting — Aluminum — 282 lbs. — 86 inches.
5. Aircraft Landing Gear — Aluminum 284 lbs. — 47 inches.
6. Missile Ring Splice — Aluminum — 54 lbs. — 20 inches.
7. Aircraft Spar Frame — Aluminum — 434 lbs. — 142 inches.
8. Missile Fin — Aluminum — 8 lbs. — 30 inches.
Faster and faster, higher and higher — greater stresses, increased temperatures — all leading to continually increasing dependence on forgings — and in the forging field there is no substitute for Wyman-Gordon quality, experience and know-how.
U.S. AIR FORCE

WYMAN-GORDON COMPANY

Established 1883

FORGINGS OF ALUMINUM • MAGNESIUM • STEEL • TITANIUM

WORCESTER 1, MASSACHUSETTS

HARVEY, ILLINOIS • DETROIT, MICHIGAN

Technical Outlook

CONTINUOUS CASTING UPGRADED— Published figures on continuous casting are too low, says Rufus Easton, manager, continuous casting section, Freyn Dept., Koppers Co. Inc., Pittsburgh. He told the 50th anniversary meeting of the AISE that the next machine built to continuously cast carbon steel should have these features: 1. Casting speed of 50 ipm. 2. Slab width enough to roll 48-in. strip, or at least 40 in. wide. 3. Slab thickness 6½ in., with provision for increase to 8 in. 4. Casting rate of 120 tons per hour. 5. Machine availability around the clock. 6. Metal availability 90 per cent. 7. Annual capacity 700,000 tons.

MORE AISE NOTES— Interlake Iron Corp., Cleveland, has been using high speed distributors on its blast furnaces at Erie, Pa.; Toledo, Ohio; Duluth, and Chicago. The tops make an average of five revolutions per skip dump, spreading the burden evenly in the furnace. Furnace lining life has increased; the coke rate has decreased; and merchant iron production has gone up.

ALSO FROM AISE— G. W. Hinds, development engineer at Linde Co., a division of Union Carbide Corp., Newark, N. J., says the jet reaction flame has been used to atomize liquid fuels in open hearth furnaces. At 3000 to 4000° F and 1000 to 1500 fpm gas velocity, it has greater radiation than the steam atomized flame. Records from 800 open hearth heats show 10 per cent lower fuel consumption, up to 30 per cent higher firing rates, and production increases of 8 to 12 per cent with the jet flame.

BONDS PLASTIC— Polyethylene may be joined directly to rubber, brass, or brass plated metal by a process developed at Bell Telephone Laboratories, New York. The adhesive used is partly hydrogenated polybutadiene. It will stand a pull of about 1000 psi. The process will protect metals from corrosion since the polyethylene can be fixed directly upon them without using intermediate material other than the adhesive. Suggested uses: Communications equipment, coatings for tanks and plating racks.

CHEMICAL MILLING— To meet increasing demands for long tapered structures going into advanced aircraft, U. S. Chemical Milling Corp., Manhattan Beach, Calif., has installed an etch tank which extends 60 ft underground. A part is tapered by controlling the rate of immersion into the solution. So the tank holding the etchant must be deep enough to hold the entire tapered section. Parts 55 ft long and 11 ft in diameter now can be processed by the company.

AUTOMATIC ASSEMBLY— An automaker has installed a machine which puts together armature core assemblies for its heater motors at the rate of 900 per hour. It can handle cores of varying stack heights and coreshafts of varying lengths. With minor changes, coreshaft diameter may also be varied. Cimco Engineering Co., Ann Arbor, Mich., built the machine.

HOT MEASUREMENT— How do you measure variations in the modulus of elasticity of a metal at 1250° F? Engineers at Westinghouse's Materials Engineering Dept. did it by adapting a standard optical gage used for measuring strains at room temperature. Changes as small as 20 millionths of an inch can be detected.

FUEL ELEMENT METHOD— A solid phase, cold bonding process for the fabrication of nuclear fuel elements has been developed by Metals & Controls Corp., Attleboro, Mass. The element, enriched uranium completely clad with zirconium or Zircaloy, is a flat strip. The company says the method lowers manufacturing expense. The element can be supplied at lower cost than others of this general type.

Metalworking Outlook—Page 113 Market Outlook—Page 229

No. 11 in STEEL's Modern Brazing Series

Brazing Alloy Selector

Here is the information you need to select the right filler metal. Properties and applications are listed in the text; tradenames, compositions, and melting ranges in the tables

MORE than 400 alloys for brazing ferrous and nonferrous metals are listed in STEEL's Brazing Alloy Selector.

Designations of the American Welding Society and American Society for Testing Materials are used to help you compare commercial alloys on the basis of chemical composition.

The AWS-ASTM specification covers only the filler metals that are used in large volume. Many are produced outside the specifications. Manufacturers should be contacted for specific uses of those alloys.

Aluminum-Silicon — Brazing filler metals in the *BAlSi* class are used for joining aluminum and aluminum alloys. *BAlSi-1*, *2*, and *3*, are best suited for furnace and dip brazing; the *BAlSi-4* metal is best for torch brazing.

BAlSi-1, *3*, and *4* are general purpose filler metals. *BAlSi-2* is available only as a coating on 3003 and 6951 aluminum alloy core sheets. *BAlSi-4* has relatively high corrosion resistant properties.

Copper-Phosphorus — The *BCuP* filler metals are used primarily for joining copper and copper alloys. They should not be used on ferrous metals or alloys containing more than 10 per cent nickel.

The selection of copper-phosphorus filler metals depends principally on joint clearance. Recommended clearances: *BCuP-1*, 0.002 to 0.005 in.; *2*, 0.001 to 0.003 in.; *3*, 0.002 to 0.005 in.; *4*, 0.001 to 0.003 in.; *5*, 0.003 to 0.005 in. *BCuP-1* is used primarily as preplaced filler metal.

Silver—The *BAg* filler metals are used for joining ferrous and nonferrous metals. Exceptions: Aluminum, magnesium, and materials that melt below 1500° F.

BAg-1, *1a*, and *2*, are free flowing and suitable for general purpose work. After brazing, they are yellow. *BAg-3* is used for joining stainless steel because it produces corrosion resistant joints. It also is used for joining carbide tool tips to shanks. It is whitish yellow after brazing. *BAg-4* also is used extensively for carbide tip brazing. It flows more freely than the *BAg-3* filler metal. After brazing, it is light yellow.

BAg-5 and *6* metals are used particularly for brazing electrical parts. They also are used in dairy and food equipment where cadmium-containing alloys might be prohibited. *BAg-7* is a general purpose, low melting point metal used particularly in furnace brazing. It blends well with metals like stainless because it is whitish after brazing. It is used a lot in dairy and food equipment.

BAg-8 is used primarily in assembling electronic and vacuum tubes. It generally is free flowing, but it does not flow well on ferrous metals. It is white after brazing.

BAg-9, *10*, and *11* are used for joining sterling silver. The three metals have different brazing temperatures and can be used for step brazing of consecutive joints. They are whitish after brazing.

Copper-Gold—The *BCuAu* filler metals have low vapor pressure and are used for joining parts in electron tube assemblies where gaseous inclusions are particularly undesirable. The variation in melting points allows step brazing.

Copper, Copper-Zinc—*BCu* filler metal is used for brazing ferrous metals, nickel, and copper-nickel alloys. It is extremely free flowing and is used in furnace brazing with a hydrogen or dissociated ammonia atmosphere.

With the *RBCuZn* metals (the R prefix means they also are suitable as welding filler metals), overheating must be avoided since voids may be formed in the joint by entrapped zinc vapors. *RBCuZn-A* is used on steel, copper, copper alloys, nickel, nickel alloys, and stainless steels. *RBCuZn-D* (called white brass and nickel silver) is used with steel, nickel, and nickel alloys.

Magnesium — *BMg* is used for joining magnesium M1 base metal. Heating must be carefully controlled to prevent melting the base metal. For furnace brazing, a small amount of beryllium is added to prevent possible ignition.

Heat Resistant—Chief use of the *BNiCr* class is in joining stainless and high nickel alloys to be used at elevated temperatures. The nickel-chrome filler metal retains its heat resistant properties up to 2000° F.

The silver-manganese alloy, also used to braze stainless and high-nickel alloys, has good strength in the 500 to 900° F range. Some of the heat resistant filler metals and silver-base alloys are available with lithium additions (usually 0.2 per cent) to aid wetting of metals which have strong oxide films.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Aluminum-Silicon

AWS-ASTM Class	Airco	Alcoa	Handy & Harman	Kaiser	Reynolds	Si	Cu	Fe	Zn	Mg	Mn	Cr	Al	Melting Range ° F
BAlSi-1	26	4043 wire	.....	4043 wire	4043 wire	4.0–6.0	0.30	0.80	0.10	0.05	0.05	...	bal	1070–1165
BAlSi-2	...	713 sheet	.....	No. 11 & 12 sheets	No. 11, 12, 21 & 22 sheets	6.8–8.2	0.25	0.80	0.20	...	...	...	bal	1070–1135
BAlSi-3	...	716 wire	.....	.....	.....	9.3–10.7	3.3–4.7	0.80	0.20	0.15	0.15	0.15	bal	970–1085
BAlSi-4	718	718 wire & sheet	Alumibraze powder	718 sheets	.....	11.0–13.0	0.30	0.80	0.20	0.10	0.15	...	bal	1070–1080

Copper-Gold

AWS-ASTM Class	APW	Fusion Eng.	Handy & Harman	Au	Cu	Melting Range ° F
BCuAu 1	BCuAu-1	AU-1750	9K, red	37.25–37.75	bal	1775–1815
BCuAu 2	BCuAu-2	AU-1600	19.2K, red	79.75–80.25	bal	1620–1630

Copper-Phosphorus

AWS ASTM Class	Airco	All-State	APW	Anchor Metal	Fulton Gold	Fusion Eng.	Goldsmith	Handy & Harman	Tricon	United Wire	Westinghouse	Ag	Cu	P	Melting Range ° F
BCuP-1	Phos-Copper	....	.....	.....	.....	P-1 1300	....	.....	.....	.....	Phos-Copper	...	bal	4.75–5.25	1305–1650
BCuP-2	Phos-Copper	21	.....	.....	.....	P-2 1300	....	.....	.....	Phoson 0	Phos-Copper	...	bal	6.75–7.50	1305–1485
BCuP-3	Aircosil 5 & 6M	....	Silvaloy 5	.....	110-A	SP-3 1200	....	Sil-Fos 5	.....	Phoson 6	Phos-Silver 6M	4.75–6.25	bal	5.75–6.70	1190–1480
BCuP-4	Aircosil 6	....	.....	Shurbond 06	.....	SP-4 1200	06	.....	.....	.....	Phos-Silver	4.75–6.25	bal	6.75–7.70	1190–1330
BCuP-5	Aircosil 15	S-115	Silvaloy 15	Shurbond 15	111-A	SP-5 1200	15	Sil-Fos	15	Phoson 15	Phos-Silver 15M	14.50–15.50	bal	4.75–5.25	1185–1500
.....	Aircosil 2	23	.....	Shurbond 02	.....	....	02	.....	1270	.....	Phos-Silver 2	1.9–2.1	bal	6.9–7.10	1190–1455

Heat-Resisting Materials

AWS-ASTM Class	Coast Metals	Fusion Eng.	Handy & Harman	Wall Colmonoy	Ag	Mn	Cr	Ni	Si	B	Other	Melting Range ° F
BAgMn*	.....	AG-1750	85 Ag-15 Mn	.....	85	15	..	..	..	...	.....	1760–1780
BNiCr**	56	AMS-4775	72	Nicrobraz	..	..	13–20	65–75	3–5	2.75–4.75	3.0–5.0 Fe 0.6–1.3 C	1740–1950
.....	.....	.....	.....	Low Carbon Nicrobraz	..	..	13–20	65–75	3–5	2.75–4.75	3.0–5.0 Fe 0.15 C max	1760–2000
.....	53	AMS-4777	82	Low Melting Nicrobraz	..	..	6.0–8.0	78–86	3–5	2.5–3.5	2–4 Fe 0.50 C max	1770–1900
.....	50 & 52	AMS-4778	91 & 93	Nicrobraz 130	..	..	..	89–95	3–5	1.8–3.5	0.50 C max	1770–1950
.....	.....	.....	.....	Nicrobraz 150	..	..	15	bal	..	3.4	0.15 C max	1900–1990
.....	.....	.....	.....	Nicrobraz 10	..	..	..	bal	..	...	11 P	1610–1610
.....	.....	.....	.....	Nicrobraz 30	..	..	18	bal	..	11	.....	1975–2075
.....	.....	.....	.....	Nicrobraz 45	..	..	..	bal	..	4.5	6.0 P	1615–1880
.....	.....	.....	.....	Nicrobraz 50	..	..	13	bal	..	...	10 P	1615–1640

*Brazing filler metals in the BAgMn class also are made by Air Reduction Sales Co. (Airco P), American Platinum Works (Silvaloy 850), Anchor Metal Co. (Shurbond 85), Fulton Gold Refiners Corp. (118-A), Goldsmith Bros. Smelting & Refining Co. (Goldsmith 85), United Wire & Supply Corp. (Sil-85M), and Westinghouse Electric Corp. (Co-Silver 85).
**Crucible Steel Co. of America produces a BNiCr filler metal called Rexweld 64.

Magnesium

AWS-ASTM Class	Dow Chemical	Al	Mn	Zn	Mg	Melting Point ° F
B Mg	AZ92A	8.3–9.7	0.10 min	1.7–2.3	bal	1110
	AZ125	12	.....	5	bal	1135
	M1A	.....	1	.....	bal	1200

Copper & Copper Zinc

AWS-ASTM Class	Airco	All-State	American Brass	Ampco Metal	Bridgeport Brass	Burdette	Central Steel & Wire	Chase Brass	Fusion Eng.	Glidden	Linde
BCu	23A	....	Copper 100	....	.....	.....	.....	E.T.PCu	Cu-1950	108,151,172, 175,203	Oxweld 63
RBCuZn-A	20	....	Tobin Bronze 481	Ampco-Braz-2	Bronze 196	Burdox 91	Sweedox Tobin	Naval Brass	B-1600	.....	.....
RBCuZn-D	....	13	Nickel Silver 828	Ampco-Braz-1	Nickel Silver 548	.....	.....	10% Nickel Silver	B-1700	.....	.....
.....	27	Low Fuming Bronze	Anaconda 997	Ampco-Braz-3	Manganese Bronze 192	Burdox 9	Bronzox-M	Low Fuming Bronze	.....	.....	25M
.....	22	....	.....	.....	Navy Manganese Bronze 191	Burdox 92	Sweedox Manganese	Manganese Bronze	.....	.....	31T

Silver

AWS-ASTM Class	Airco	Alloy Spec. Co.	All-State	APW	Anchor Metal	Baker	Fulton Gold	Fusion Eng.	General Plate	Gold-smith	Handy & Harman
BAg-1	45	45	S-145	Silvaloy 45	Shurbond 45	....	114-AN	S4-1000 S5-1000	.....	45	Easy-Flo 45
BAg-1a	50	50	S-150	Silvaloy 50	Shurbond 50	235	G4-115	S4-1050 S5-1050	KH-7	50	Easy-Flo
BAg-2	35	....	S-135	Silvaloy 35	Shurbond 35	....	113-A	S4-1100 S5-1100	.....	35	Easy-Flo 35
BAg-3	3	....	S-150N	Silvaloy 503	Shurbond 350	....	G5-115	S4-1200 S5-1200	KH-4	350	Easy-Flo 3
BAg-4	E	....	100	Silvaloy 250	Shurbond 240	....	114	S4-1240 S5-1240	.....	240	SS
BAg-5	G	....	....	Silvaloy A-18	Shurbond 145	....	114-A	S4-1250	.....	145	DE
BAg-6	H	250	....	Silvaloy 25	Shurbond 250	....	A-115	S4-1275	KH-2	250	ETX
BAg-7	J	....	155	Silvaloy 355	Shurbond 56	....	F.G.R.	S4 5-1150	G355	56	ER
BAg-8	M	....	....	Silvaloy 301	Shurbond 72	179	117-2	EUT-1400	ML	72	BT
BAg-9	Easy	....	....	Silvaloy Easy	Shurbond 65	....	216-A	AG9-1280	SK-4	65	Easy
BAg-10	Medium	....	....	Silvaloy Medium	Shurbond 70	....	217	AG10-1335	MH-4	70	Medium
BAg-11	Hard	....	....	Silvaloy Hard	Shurbond 75	....	217-A	AG11-1365	.....	75	Hard
.....	N	....	....	Silvaloy A-49	.....	....	218	AG12-1360	.....	80	IT
.....	....	....	....	Silvaloy K-427	.....	....	.....	.....	.....	275	TR #1
.....	....	....	....	.....	.....	....	.....	.....	.....	175	Hard #1
.....	....	....	....	.....	.....	....	.....	EUT-1385	.....	.....	RE-MN
.....	....	....	....	.....	.....	....	.....	EUT-1275	.....	.....	RS-NI
.....	60	....	....	Silvaloy 60	Shurbond 60	....	.....	S4-1090	.....	.....	RT-SN
.....	K	....	....	Silvaloy A-33	Shurbond 33	186	216	S4-1260	SH-4	60	RT
.....	L	....	....	Silvaloy 54	Shurbond 54	....	.....	S4-1325	KC-4	54	AMS 4772
.....	Q	....	....	Silvaloy A-28	Shurbond 28	....	LA-115	.....	.....	.....	.....
.....	F	....	....	Silvaloy A-14	Shurbond 14	....	A-114	S4-1330	CB-1	.....	DT
.....	R	....	164	Silvaloy 254	Shurbond 254	....	.....	S4-1240N	.....	540	SS-5
.....	....	....	....	.....	.....	....	.....	.....	.....	.....	....
.....	....	....	....	.....	.....	....	.....	.....	.....	31	.....
.....	D	....	....	Silvaloy A-13	Shurbond 13	....	113	30S-1400	.....	30	NT
.....	S	....	....	Silvaloy A-79	Shurbond 79	....	.....	25S-1500	.....	25	NE
.....	C	....	120	Silvaloy 20	Shurbond 20	240	112	20S-1140	LH-1	20	ATT
.....	B	....	....	Silvaloy A-11	Shurbond 120	....	G-112	20S-1430	LH-4	120	AT Special
.....	....	....	....	.....	.....	....	.....	.....	LH-3	.....	.....
.....	....	....	....	Silvaloy A-4	Shurbond 4	....	111	.....	BH-2	110	.....
.....	A	....	....	.....	.....	....	.....	9S-1450	.....	.....	TL
.....	....	....	....	Silvaloy D-275	.....	....	.....	Cu-1500	.....	07	Sn 7
.....	....	....	....	.....	.....	....	.....	.....	.....	05	TE Special

Natl. Cylinder Gas	Page Wire	Revere	Titan	Victor	Williams	Cu	Zn	Sn	Fe	Mn	Ni	P	Pb	Al	Melting Range ° F
.....	.....	100, 102	.....	.....	.....	99.90 min	...	...	...	...	...	0.075	0.02	0.01	1980
3000	Naval Bronze	Roman Bronze 380	Naval Bronze W-60	.....	Tobin Bronze 481	57–61	rem.	0.25–1.00	...	...	...	...	0.05	0.01	1630–1650
5200	.....	.....	Ti-Nic-O-Sil 54	.....	10% Nickel Silver 828	46–50	rem.	...	...	...	9.0–11.0	0.25	0.05	0.01	1690–1715
3500	.....	Low Fuming 456	Manganese Bronze W-17&W-78	10	Low-Fuming Bronze 997	56–60	rem.	1.0 max	...	0.25–1.00	...	...	...	...	1400–1600
3101	Manganese Bronze	Manganese Bronze	Naval Manganese Bronze	30	.....	58–60	rem.	0.60–0.90	0.35–0.50	0.15–0.30	0.25–0.40	...	0.05 max	0.01 max	....

Tricon	United Wire	Westinghouse	Ag	Cu	Zn	Cd	Other	Melting Range ° F
45	Sil-Bond 45	Co-Silver 45C	45	15	16	24	.....	1125–1145
50	Sil-Bond 50	Co-Silver 50C	50	15.5	16.5	18	.....	1160–1175
35	Sil-Bond 35	Co-Silver 35C	35	26	21	18	.....	1125–1295
503	Sil-Bond 50N	Co-Silver 50N	50	15.5	15.5	16	3 Ni	1170–1270
.....	Sil-40N	Co-Silver 40N	40	30	28	..	2 Ni	1240–1435
.....	Sil-45	Co-Silver 45	45	30	25	..	.....	1250–1370
.....	Sil-50	Co-Silver 50	50	34	16	..	.....	1270–1425
.....	Sil-56T	Co-Silver T	56	22	17	..	5 Sn	1145–1205
.....	Sil-72	Co-Silver 72-28	72	28	..	..	.....	1435–1435
.....	Sil-65	Co-Silver 65	65	20	15	..	.....	1235–1310
.....	Sil-70	Co-Silver 70	70	20	10	..	.....	1275–1360
.....	.....	.....	75	22	3	..	.....	1365–1450
.....	Sil-80	Co-Silver 80	80	16	4	..	.....	1360–1490
.....	.....	.....	75	..	25	..	.....	1300–1345
.....	.....	.....	75	20	5	..	.....	1350–1425
.....	.....	.....	65	28	..	..	5 Mn 2 Ni	1385–1445
.....	.....	.....	63	28.5	..	..	6.0 Sn 2.5 Ni	1275–1475
.....	.....	Co-Silver 60T	60	30	..	..	10.0 Sn	1115–1325
.....	.....	Co-Silver 60	60	25	15	..	.. ..	1260–1325
.....	Sil-54N	Co-Silver 54	54	40	5	..	1 Ni	1325–1575
.....	.....	.....	50	28	22	..	.....	1250–1340
.....	.....	.....	40	36	24	.	.....	1330–1445
.....	.....	.....	40	30	25	..	5 Ni	1240–1560
.....	Sil 40	Co-Silver 40	40	30.5	29.5	..	.....	1150–1350
.....	Sil-Bond 31	Co-Silver 31C	31.5	34	15.5	19	.....	1165–1390
.....	Sil 30	Co-Silver 30	30	38	32	..	.....	1370–1410
.....	Sil 25	Co-Silver 204	25	52.5	22.5	..	.....	1500–1575
.....	Sil 20C	Co-Silver 20C	20	45	30	5	.....	1140–1500
.....	Sil 20	Co-Silver 20	20	45	35	..	.....	1430–1500
.....	.....	.....	19.45	47.75	32.8	..	.....	1440–1500
.....	.....	.....	10	52	38	..	.....	1450–1565
.....	Sil-9	Co-Silver 9	9	53	38	..	.....	1450–1565
.....	Sil-7T	Co-Silver 7T	7	85	..	..	8.0 Sn	1225–1805
.....	Sil 5	Co-Silver 5	5	58	37	..	.....	1575–1600

Companies that Supply Brazing Alloys:

Air Reduction Sales Co., New York

Alloy Specialties Co., Swissvale, Pa.

All-State Welding Alloys Co. Inc., White Plains, N. Y.

Aluminum Co. of America, Pittsburgh

American Brass Co., Waterbury, Conn.

American Platinum Works, Newark, N. J.

Ampco Metal Inc., Milwaukee

Anchor Metal Co. Inc., Brooklyn, N. Y.

Baker & Co. Inc., Newark, N. J.

Bridgeport Brass Co., Bridgeport, Conn.

Burdette Oxygen Co., Cleveland

Central Steel & Wire Co., Chicago

Chase Brass & Copper Co. Inc., Waterbury, Conn.

Coast Metals Inc., Little Ferry, N. J.

Crucible Steel Co. of America, Pittsburgh

Dow Chemical Co., Midland, Mich.

Fulton Gold Refiners Corp., New York

Fusion Engineering, Cleveland

General Plate Div., Metals & Controls Corp., Attleboro, Mass.

Glidden Co., Hammond, Ind.

Goldsmith Bros. Smelting & Refining Co., Chicago

Handy & Harman, New York

Kaiser Aluminum & Chemical Sales Inc., Chicago

Linde Co., division of Union Carbide Corp., New York

National Cylinder Gas Co., Chicago

Page Steel & Wire Div., American Chain & Cable Co. Inc., Monessen, Pa.

Revere Copper & Brass Inc., New York

Reynolds Metals Co., Louisville, Ky.

Titan Metal Mfg. Co., Bellefonte, Pa.

Tricon Mfg. Co., Chicago

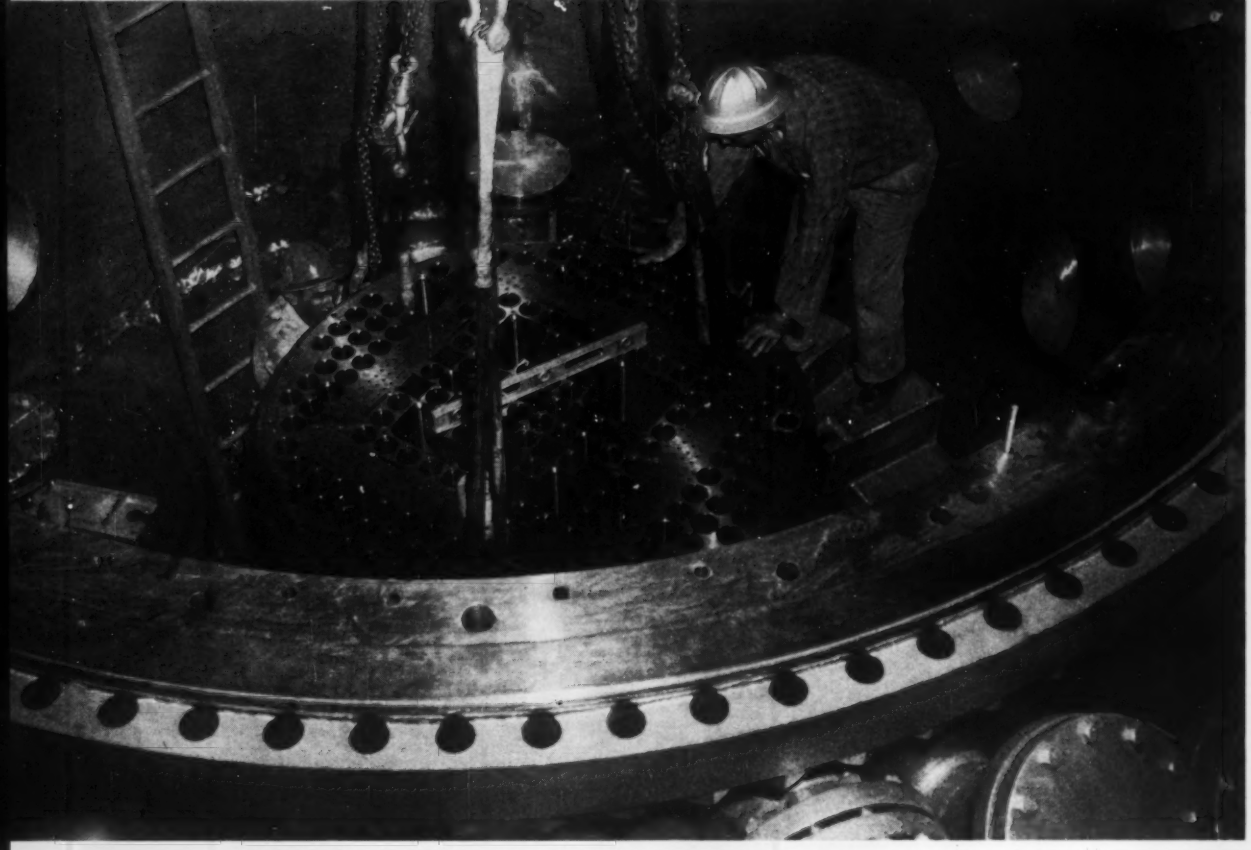
United Wire & Supply Corp., Providence

Victor Equipment Co., San Francisco

Wall Colmonoy Corp., Detroit

Westinghouse Electric Corp., Montevallo, Ala.

Williams & Co. Inc., Pittsburgh



Grid plate of test reactor is lowered into 35-ft deep pressure vessel. The large square and rectangular holes, 17 in all, accommodate materials and components which are subjected to the reactor's high thermal and neutron atmosphere

Supertester for Reactor Materials

Last week the AEC unveiled its $14-million test reactor which speeds up the evaluation of materials for use in atomic powerplants. It's the world's most potent nuclear source for testing

WHAT happens to structural materials and components when they are bombarded by neutrons and gamma radiations in an atomic powerplant? The answers are of top urgency to the builders of all types of nuclear power systems.

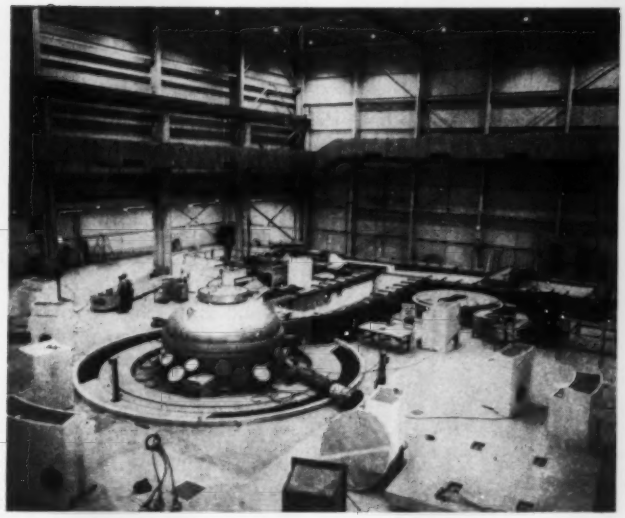
The new Engineering Test Reactor (ETR) brings into operation the world's most powerful instrument for studying the problems.

- It has the highest neutron flux —about double that of any other reactor available for testing materials.
- It is the only test reactor with any significant amount of experimental space within its core.

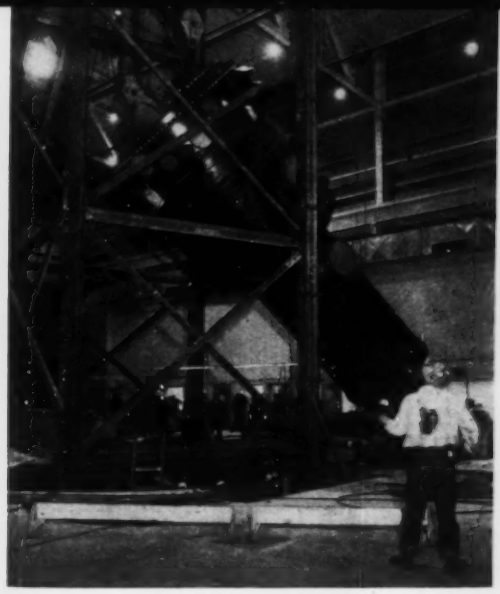
Concentrated Test—The rate of flow of neutrons (flux) created by the fissioning of enriched uranium in the core of the ETR will be close to 2 million billion neutrons per square centimeter per second. Such intensity will accelerate testing.

The fissioning process will also create heat at the rate of 600,000 million Btu per hour, more than four times the heat of any other test reactor.

Test Space in Core—Nine holes range from 3 in. to 9 in. square by 36 in. long. They are many times



Top of ETR showing plate type covers in place over experimental access holes. The white blocks are removable concrete shields which fit around the reactor during operation



Largest piece of equipment is reactor pressure vessel shown being lowered into shielded pit. Built of carbon steel clad with stainless, it's 10 ft in diameter

larger than any available previously.

Immediately adjacent to the core are 131 additional experimental holes. Eight are 3 in. square by 36 in. long. Some are larger.

The cores holes open the way for testing within loops or tubes which can pass through the core and connect with equipment outside the test reactor. Environmental conditions will be as severe as those encountered by components and materials in end use.

The usefulness of a testing reactor may be measured by the neutron flow that's available. A high flow (flux) means less time required for exposure of the sample. Generally, the time needed for exposure is inversely proportional to the neutron flow.

Need More Test Reactors—The point was brought out by W. Kenneth Davis, director of reactor development for the AEC. Speaking at the dedication program, he said that 30 high temperature power producing reactors are built, being built, or planned in the U. S. They are for U. S. and foreign locations.

Of the 22 reactors sufficiently advanced to have their specifications completed, there are at least six major types and some 18 variations.

Major types and their variations have one thing in common: The release of large quantities of energy in an environment of intense nuclear radiations.

All the materials of construction in the region of the reactor core—control elements, fuel elements, moderator materials, and reactor coolant—must work in this environment. The materials are subject to the effects of neutrons and radioactivity resulting from the fissioning fuel, in addition to conditions and stresses normally found in a nonnuclear environment, such as the boiler of a steam plant.

What Radiations Do—They affect the structural integrity of some materials, Mr. Davis pointed out. Hardness and tensile strength are increased. Thermal conductivity and ductility are decreased.

Atoms also may be transmuted. For example, when boron is used in reactor control materials, lithium and helium may be formed. Being a gas, helium might cause trouble if it is confined.

Exposure to radiation may accelerate or inhibit corrosion.

Reactor radiations may cause trouble with fuel elements. Natural uranium shows a tendency to grow in some directions when irradiated with neutrons. The fissioning process may result in stresses.

Reasons for Testing—It's important to predetermine the effect nuclear radiations will have on the materials to be used.

Mr. Davis predicted that more than 17 new test reactors will be needed to support the installation of more than 2200 nuclear powerplants in the United States through 1980.

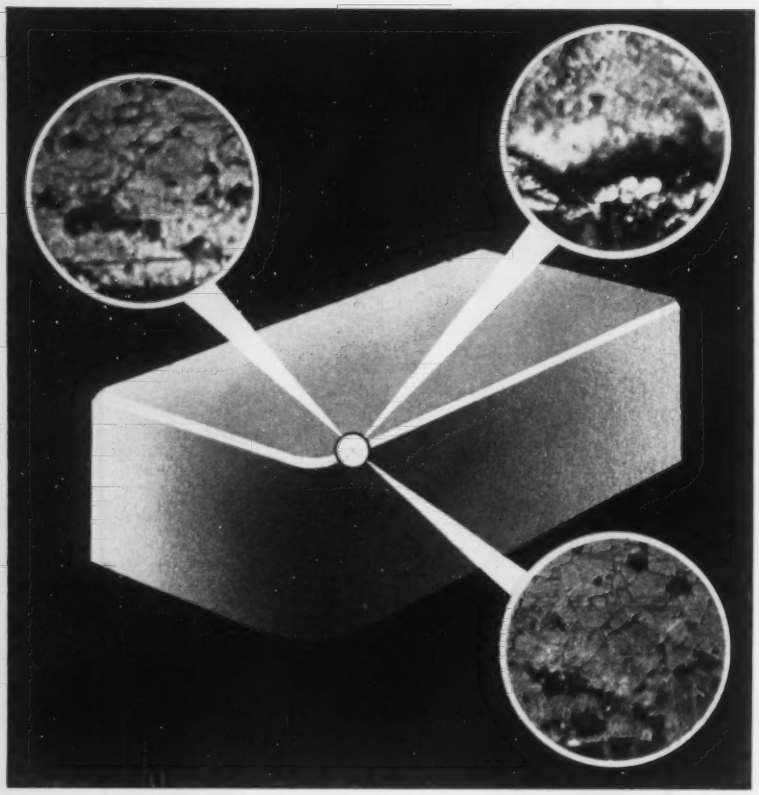
The ETR "went critical" last month—23 months after the start of construction by Kaiser Engineers, a division of Henry J. Kaiser Co., Oakland, Calif. General Electric Co. was responsible (as a subcontractor to Kaiser) for the reactor's nuclear process design.

The largest single piece of equipment within the ETR is the reactor pressure vessel—a cylinder of carbon steel clad with stainless, 10 ft in diameter and about three stories high. It holds the uranium core with its experimental spaces.

Fuel required for the reactor is 26 to 44 lb of highly enriched uranium. Refueling is done every 20 operating days.

The vessel is cooled by demineralized water which circulates through it at 44,000 gpm.

The ETR facility occupies 8 acres within the National Reactor Testing Station, about 50 miles west of Idaho Falls, Idaho.



Photomicrographs (clockwise) show tool surface before cut was taken, after the cut, and after acid removed the film. In the top left and bottom right views, similar grain boundaries are visible. In the center view, boundaries are obscured. The cut was taken at 1500 sfpm on 1045 steel

New Slant on Ceramics

Photomicrographs show deposits and a built-up edge on these cutting tools. It's possible that both come from the workpiece. Finding raises several questions

UP TO NOW, people who deal with ceramic cutting tools have assumed there is no welding of metal to the tip. In fact, they believe there is no bonding of workpiece material to the tool.

Now there's evidence to the contrary. A film of material does wipe off on the cutting tool in the area of the cutting edges, and there is a degree of buildup. One logical conclusion is that the film and the buildup come from the workpiece.

Proof of this deposit came by accident. Warner & Swasey Co., Cleveland, is sponsoring a ceramic tool research project at Ohio State University through its Engineering Experiment Station. Professor H. D. Moore and D. R. Kibbey of the Industrial Engineering Dept. are running a series of studies on tool wear.

Examining photomicrographs of the cutting edges before and after use, they wanted to find out how the tool breaks down. To their surprise, the ceramic grain structure, clearly visible in "before" photos, was missing from pictures taken after the ceramic had taken a cut.

A film was blocking out the grain boundaries. When the tool was leached with an acid, grain boundaries reappeared.

What Does It Mean?—Professor Moore isn't sure. "Preoccupation with other goals in our current projects makes it impossible for us to learn as much as we'd like to about this film." It would take a separate project to find answers to questions like these:

What is the film? How is it held on the tool? How thick is it? How does it affect tool life? How does it affect cutting?

Speculation—"The film is there. That much is certain," Professor Moore assures us. Although the researchers hesitate to go farther, they do have some hunches:

The film must be workpiece material. It probably clings to the microscopic valleys between ceramic grains. It may be extremely thin—some samples have been nearly transparent. It may assist cutting—some tools have cut better before the film was leached off. One explanation: The film could act as a lubricant similar to low-shear sulfide deposits left by some cutting oils.

Tool Wear

The Ohio State projects show that about 90 per cent of ceramic tool wear is caused by grains pulling out. Danger of the pull-out is greatest when the tool first enters the cut. Mr. Kibbey recommends: "Don't start the tool any oftener than you have to. Long, continuous cuts are the answer wherever they're practical."

Officers Elected

Frank H. Habicht is the new president of the American Machine Tool Distributors' Association. Elected at the association's annual meeting in Cleveland, Mr. Habicht is president and general manager, Marshall & Huschart Machinery Co., Chicago. J. O. Ellison, president, Harron, Rickard & McCone Co. of Northern California, San Francisco, was elected vice president.

US RUBBER **POWERGRIP "TIMING" BELTS**

"Here's how to sharpen the brains of memory machines,"

says Plant Engineer "GRIP" POWERS

SCHEMATIC OF U.S. POWERGRIP "TIMING" BELT DRIVE ON BOESCH TOROID WINDER (MODEL SM-C)
(A) ⅛ hp motor pulley–3450 rpm, 1¾" diam.
(B) jack shaft pulley–2156 rpm, 2¹⁵⁄₁₆" diam.
(C) jack shaft pulley–2156 rpm, 1¾" diam.
(D) grooved idler–fixed, 1¹⁵⁄₃₂" diam.
(E) spring loaded idler–1¹⁵⁄₃₂" diam. Pivot arm, attached to spring, compensates for manufacturing tolerances and travel of (F).
(F) spindle head pulley–3800 rpm, 1¹⁵⁄₃₂" diam. Pulley can be moved 1" in near-flat arc, to set before winding toroid core.
Because of very short centers, small pulley diameters, high speeds and the need for precise control, Boesch selected PowerGrip drives. They have simplified the machine, made it more compact, and more than doubled the life of the drive.
1"
7"
3"
(F)
(E)
(D)
(TB)
(A)
(B)
(C)
(TB)
7"

The "brains" of electronic memory machines are centered in toroids–tiny, doughnut-shaped coils of thousands of turns of tightly wound wire. Winding these toroids requires the utmost precision. That's why Boesch Mfg. Co. (Danbury, Conn.), a leading maker of toroid winders, uses U.S. PowerGrip "Timing"® Belts on their power transmission drives.

U.S. PowerGrip "Timing" Belts have an efficiency of close to 100%. The belts need no lubrication, no maintenance, are more accurate and quieter than drives formerly used and far safer to both operator and machine.

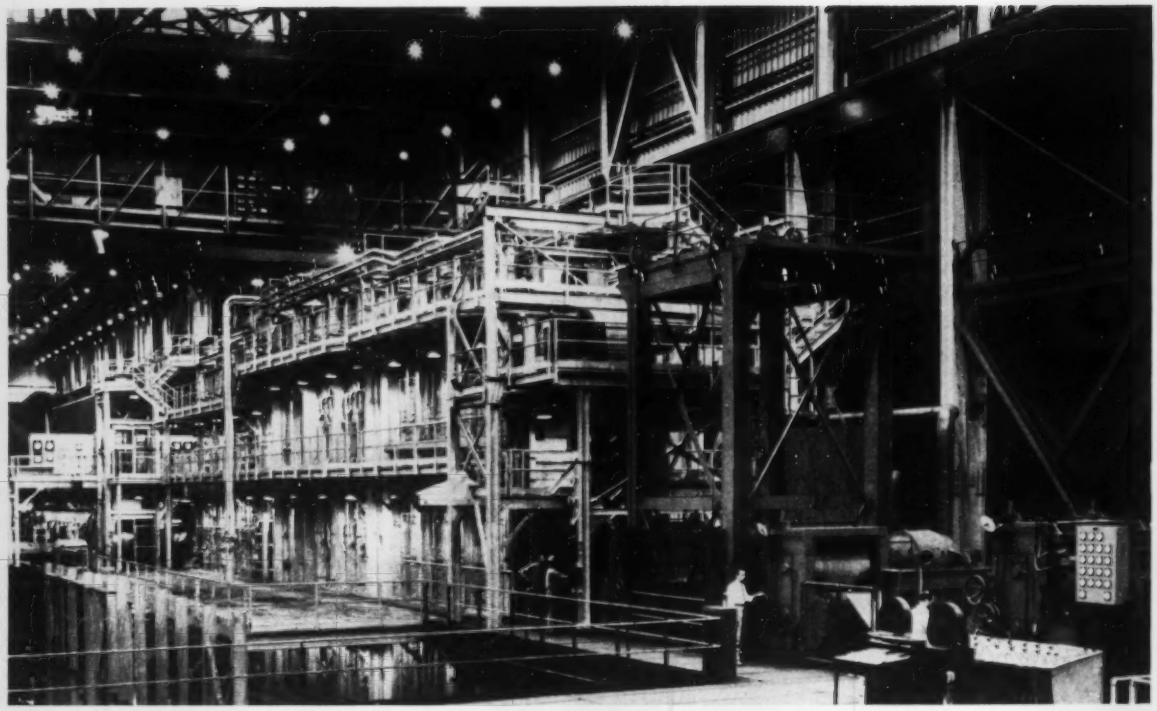
Says the chief engineer of Boesch: "We also use U.S. PowerGrip on our toroidal tape winders and bobbin winding machines. Our engineers and 'U.S.' engineers work hand in hand on *all* our wind-up problems involving power transmission."

A complete line of PowerGrip "Timing" Belt drives–plus expert power transmission engineering assistance–is obtainable at any of the 28 "U.S." District Sales Offices, at selected distributors, or write U.S. Rubber, Mechanical Goods Div., Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Co. Ltd.

US RUBBER **Mechanical Goods Division**

United States Rubber

SEE THINGS YOU NEVER SAW BEFORE. VISIT U.S. RUBBER'S NEW EXHIBIT HALL, ROCKEFELLER CENTER, N.Y.



Just starting production, this 2000-fpm tin plating and annealing line processes 30-ton coils. Cleaning and annealing section (above) handles 20,000 tons a month

Expansion Accents Productivity

Weirton Steel's management believes that one way to greater productivity lies in king-size facilities. The latest: A 2000-fpm annealing line

WHILE STILL a year away from completion of its half of National Steel Corp.'s $500 million, ten year expansion program, Weirton Steel Co. has shown its new facilities to newsmen. "We wanted to show our employees that we are proud of them and the mill they operate so well," says E. O. Burgham, Weirton's president. The company also upheld its reputation for unusually large production facilities.

On display for the first time was a continuous cleaning and annealing line that handles 60,000-lb coils of tin plate up to 45 in. wide at speeds up to 2000 fpm. The huge line has a capacity of 20,000 tons a month, or 60 tons an hour.

Up and Down—Unusual features include the building in which it is housed. Built on land sloping away to the Ohio River, the level on which the cleaning portion of the line is constructed is actually the fourth floor of the building. Looping towers extend almost 50 ft above and below this working floor level, permitting 700 ft of strip to be looped in each tower with a minimum of rollers.

Space has been provided for addition of two more duplicate lines.

Just getting into production is the third and largest of four new continuous coil galvanizing lines. It will operate at a maximum 300 fpm and produce galvanized steel in 18 to 48 in. widths in the heavier gages. It has a capacity of 12,000 tons per month. Continuous galvanizing line No. 4 is still under construction. It will produce Weirkote products up to 42 in. wide and have a capacity of 8000 tons per month.

Hot Mill—The key facility in the Weirton plant, the 54-in., continuous hot mill, has undergone a complete rehabilitation that has ex-

HOT STRIP MILLS

Designed and Built by MESTA

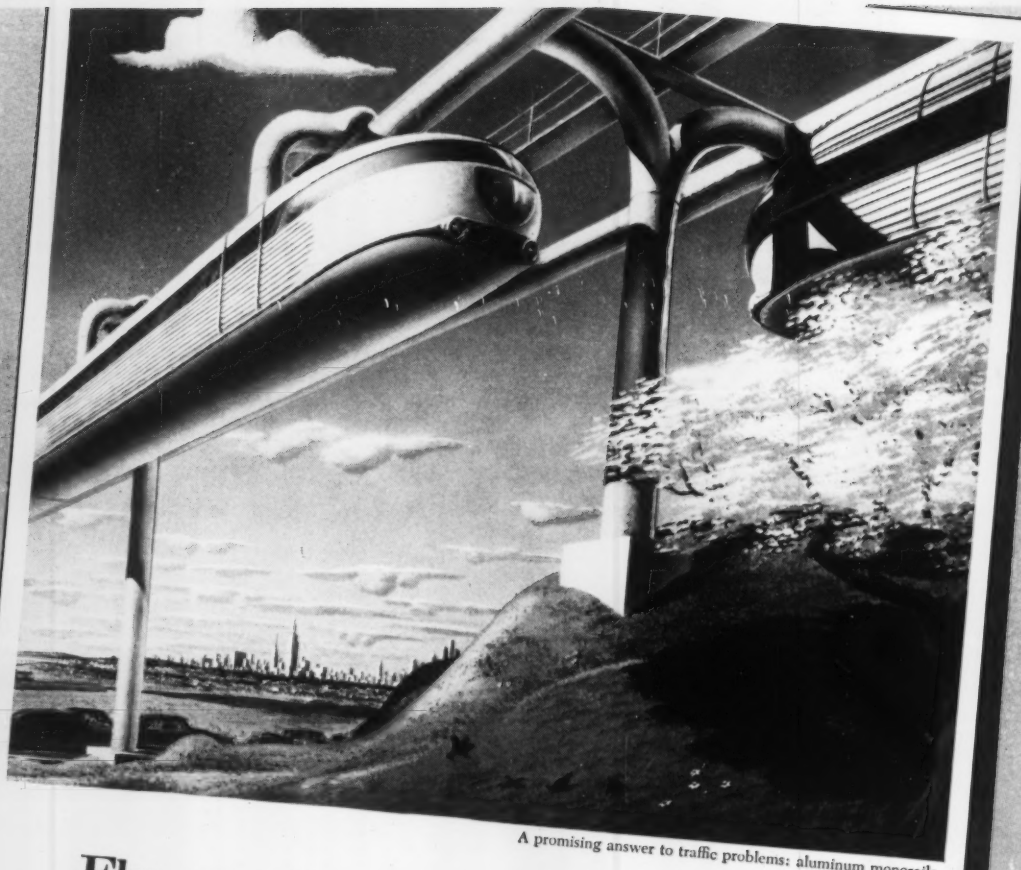
MESTA 56" Four-High Hot Strip Mill for Rolling Stainless, Silicon, High-Alloy, and Carbon Steels at Allegheny Ludlum Steel Corporation

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

MESTA
THERE IS NONE BETTER



A promising answer to traffic problems: aluminum monorails.

Fly over traffic...on sky hooks!

Bring an airport into the center of town . . . a country home within *minutes* of your office . . . move a seaside beach to the edge of an inland city!

A monorail made of light, strong, corrosion-resistant aluminum can do it! Test installations already in service indicate these flying trains will eventually skim over traffic at speeds of over 100 miles per hour.

Aluminum gets people places *faster*. And it does countless *other* jobs superbly well. That's why aluminum is the world's fastest growing metal.

To meet steadily expanding requirements for the vast amounts of electricity needed to separate aluminum from its ore, Aluminium Limited, an independent Canadian company, is completing one of the world's largest hydroelectric projects. This project will create 3,580,000 horsepower for the production of aluminum . . . power not needed by growing cities or other industries.

The world's second largest producer of aluminum ingot, Aluminium Limited sells no end products in the United States. It concentrates, instead, on supplying hundreds of independent U. S. fabricators with a steady, dependable flow of raw material essential to business, to industry and defense.

Aluminium Limited, Montreal: *Canada's independent producer of aluminum ingot for U.S. industries.*

Aluminum from Canada

Aluminum shines brightest in metalworking's crystal ball

Here's just one example of the big jobs that lie ahead for aluminum . . . projects that mean continually growing sales volume for United States aluminum fabricators.

Aluminium Limited *Sales, Inc.*

630 Fifth Avenue, New York 20, N.Y., Atlanta, Detroit, Chicago, Los Angeles, Cleveland, Buenos Aires, São Paulo

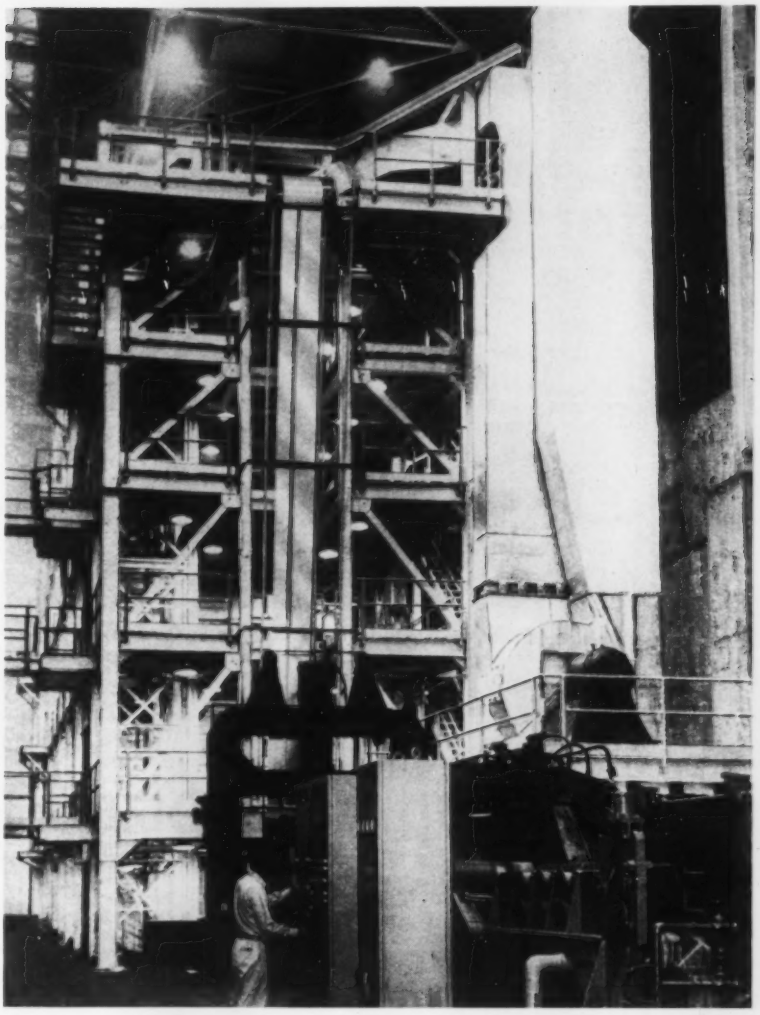
EXPANSION . . .

tended back to the ingot and ahead to the cold mills. By increasing ingot size and going to a 7½ in. (instead of 5½ in.) by 26 ft slab, hot strip production was increased by 60,000 tons a month. The 54-in. hot mill now has a capacity of 225,000 tons a month.

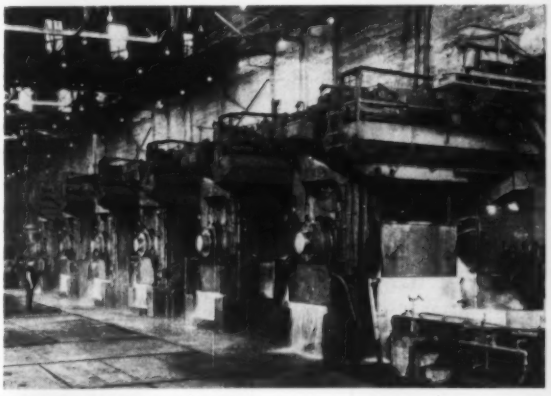
The company claims that "this fastest hot sheet rolling mill of its size" (2400 fpm) has provided the incentive and capacity for the "world's speediest cold reducing tandem mill" (7000 fpm), the industry's "three largest reheating furnaces" (200 tons of 26-ft slabs an hour each), and the "widest slabyard" (128-ft span).

Hot Metal—To back up these record setters, Weirton also has the "biggest bessemer converter" to blow hot metal for "the most productive open hearth shop with the biggest open hearth furnace—600 tons" (but its partner in the corporation, Great Lakes Steel Co., has the biggest blast furnace).

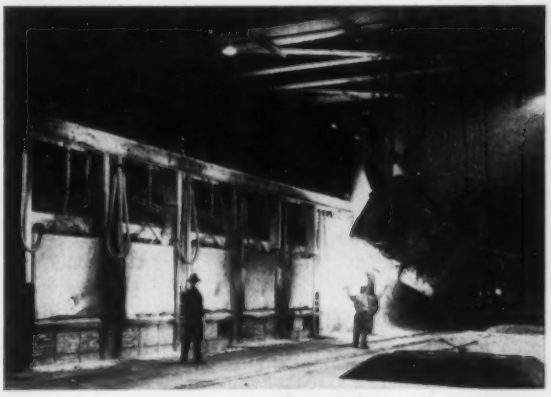
This accent on bigness (of which Weirton has more than its share) is backed up with a reputation for getting maximum production per unit. The company has been able to add the equivalent of a fifth blast furnace to its hard-driving battery of four by careful charge preparation with up to 50 per cent sintered ore, and by the use of oxygen and increased moisture in the blast. Production on one blast furnace alone was boosted from 1441 to 1720 tons of iron a day over a three-month period.



Continuous galvanizing line is the third for Weirton and its biggest. It handles coils to 48 in. wide. Strip at center comes from annealing and enters galvanizing pot



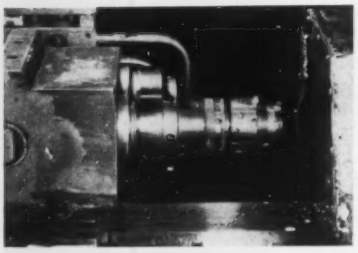
Renovated 54-in. hot mill now runs at 2400 fpm. Only four days' production was lost in its reconstruction



No. 14, 600-ton open hearth is said to be industry's biggest. The furnace is producing up to expectations

Operator replaces toolholder in finish boring operation at Ford Sterling plant

Boring Setup Holds Size



Close-up shows chuck and boring tool in special boring machine

DESPITE a tolerance of plus 0.001 in., minus zero, finish boring for bearings and oil seals in the rear axle housing assembly is a smooth running job at the Ford Sterling Chassis Parts Div. plant outside Detroit.

The job is done on a special Excello boring machine. The combination of a precision chuck and a special cutter head, provided by Scully-Jones & Co., Chicago, has eliminated many of the problems that were encountered when the plant went into operation about a year ago. The part being machined is SAE 1010 steel. The first tool removes 0.001 to 0.013 in. of stock; the second tool takes out 0.012 to 0.014 in.

Tooling Setup—The design of the chuck eliminates clearance and play along the chucking surface and creates a shrink fit on the shank or holder. The tool is held accurately in position. Any tendency to vibrate or be offcenter is eliminated. With this setup, about 300 pieces per tool change are being finished.

A spare toolholder is used to minimize machine downtime. Carbide tool tip spares are kept at the machine. A gage made by Scully-Jones is used to preset the sharpened tips in the holder. When toolholders are changed, no adjustments in the machine are necessary. The dull tool tips are taken to the toolroom periodically for resharpening.

Castings Are Forged

The method increases strength of some nonferrous metals by as much as 65 per cent

STRENGTH of aluminum, magnesium, and titanium castings can be increased by press forging and aging, says Armour Research Foundation, Chicago. The method was developed under a contract of the Air Materiel Command's Manufacturing Methods Branch.

Cast magnesium lever arms, used in the elevator control assembly of T-34 aircraft, were press forged with a 17 per cent deformation. The ultimate strength increased 17.7 per cent and yield load by 39.5 per cent. The tests show that increases in strength can be predicted closely by press forging test bars.

Aluminum—On aluminum (alloy 356) press forging with a 20 per cent reduction and aging increased ultimate strength 11 per cent and yield strength 20 per cent. Elongation decreased.

Aging for longer than normal times gives properties similar to those of press forging, Armour reports. Press forging castings of the 356 alloy would be limited to cases where critical areas on a casting need strengthening.

Magnesium—A forging temperature of 400° F and normal aging were found best for magnesium AZ92. A 20 per cent deformation increased ultimate strength 19.5 per cent and yield strength 43 per cent, with no loss in ductility.

Titanium—Armour found that a temperature of 1400° F was necessary to forge cast bars of titanium alloy 6Al-4V without cracking. That temperature limits the benefits likely from forging because it is close to the recrystallization point.

Chilling by the forging dies caused most of the test bars to crack. Ultimate and yield strength increased about 0.5 per cent. No change occurred in elongation.

Further tests will be made to determine the difference in physical properties of forgings and forged castings. It is also contemplated that tests will be run to determine if the cast-forged process can be used on steel.

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If you are building construction equipment, investigate *T & W Technique* for producing forgings and deep drawn stampings. At the right are two examples of how a fully coordinated team of engineering and production facilities at T & W's Forging and Stamping Divisions serve industry better.

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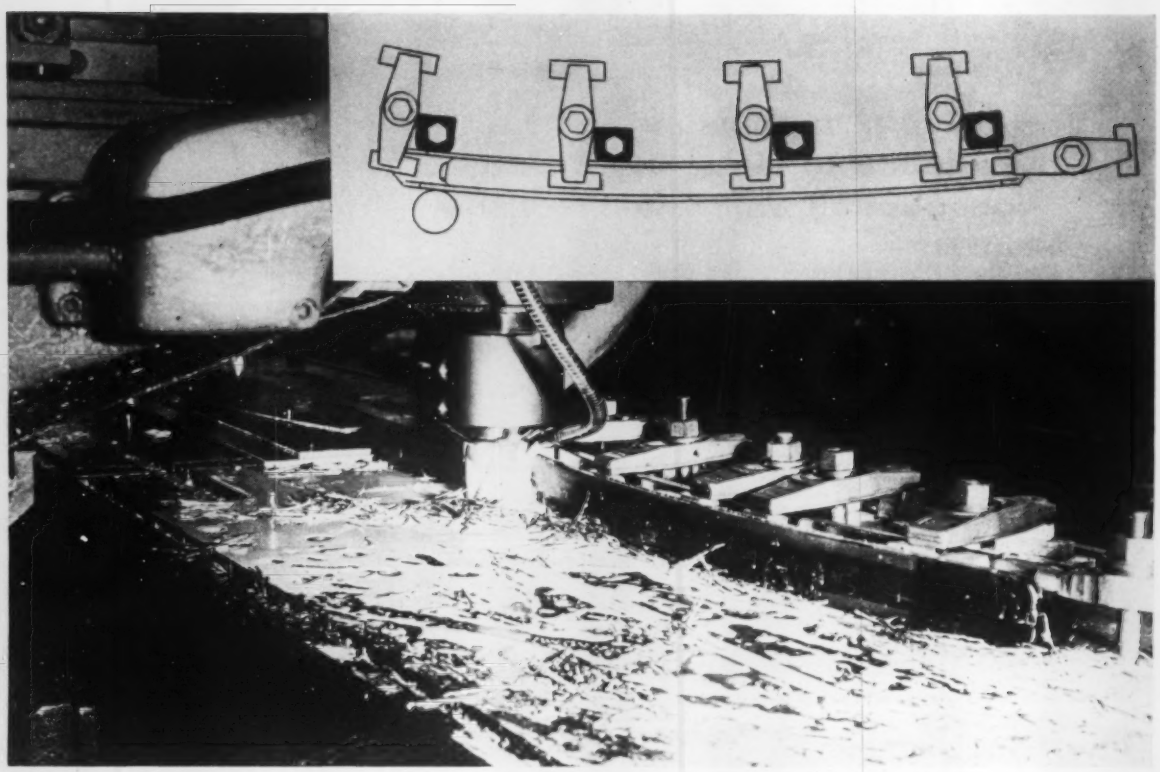


Profile milling of these parts succeeded when helical carbide end mills were used. The inset shows how backup blocks and clamps were used to add rigidity

Tips on Titanium Milling

From tests and production runs at the author's company come these recommendations. Here are problems to watch for and some ideas on side-stepping them

By A. L. WINKLER
Manufacturing Research & Development
Martin Co.
Baltimore

WHAT KIND of tool do you use to mill titanium? Should it be high speed steel? Cast alloy? Carbide?

There is no absolute answer, but Martin engineers have made some progress in the right direction.

Case History

We tried to face, profile, and slot some AMS 4925 forgings which were 36 in. long. Facing cuts were made with several combinations of carbide grades, rake angles, feeds, and speeds.

Regardless of the combination, we couldn't overcome welding of chips to the cutting edges and extremely short tool life.

Although we finished face milling this initial lot of parts with high speed steel face mills, production was low, tool life short—and we had a critical part warpage problem. We were using speeds of about 50 sfpm, with a feed of 0.750 in. a minute.

Second Try—On the next lot of parts, we used carbide slab mills. The cutters had been designed for aluminum. They were C-2 carbide with either 30 or 45-degree helix angles. Conventional cutting limited contact between the tooth face and the forging scale.

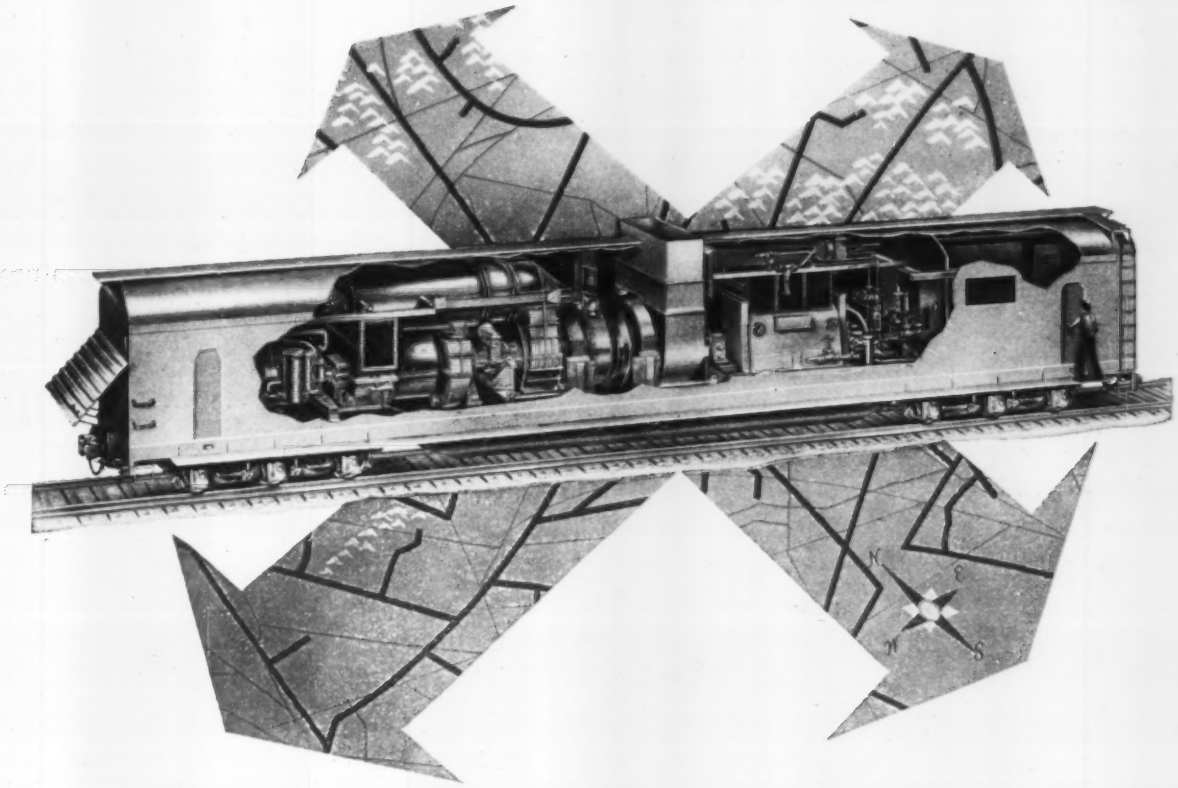
Best results came at 120 sfpm with a 3-in. feed. We used a liberal flow of sulfur base oil. The helical spiral of the cutting teeth helped the chips slide away fast enough to keep them from welding to the cutting edges. Surface finishes were better than those we got with face mills. Warped parts became a rarity. Cutters with a 30-degree spiral cut every bit as well as those with 45 degrees, but the 45 gave better part finishes.

Tool life was excellent; cutters sometimes went through two 8-hour shifts without regrinding.

Contouring

We profile milled these parts on Hydro-Tels. We started with

KILOWATTS



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Outside Diameter	Minimum Wall	Length
2½" to 3"	1/4"	88" maximum
3" to 6" Inclusive	5/16"	110" maximum
Over 6" to 12" Inclusive	3/8"	168" maximum, 24" minimum
Over 12" to 14" Inclusive	7/16"	168" maximum, 24" minimum
Over 14" to 20" Inclusive	1/2"	180" maximum, 48" minimum
Over 20" to 24" Inclusive	1/2"	88" maximum
Over 24" to 32" Inclusive	5/8"	80" maximum

This is standard piping. Special cylindrical shapes in comparable high alloy steel can be cast centrifugally . . . retorts, furnaces, fractionaters and other such equipment come in this class.

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TITANIUM MILLING . . .

HSS end mills. Even after we strengthened the setup with back-up blocks and clamps (see photo, Page 176), tool life was limited to several passes, and 1.5 in. a minute was the top feed rate. When we switched to helical carbide end mills, feed rates went to 3 in. a minute and tool life in some cases was more than 8 hours.

We found you must feed the cutters into the cut gradually to keep them from grabbing and breaking. In several trials, the side of a ¾-in. carbide end mill was used for profiling the side of a ¾-in. deep slot. It didn't work. The shank flexed, and the entire end of the mill broke off just above the carbide flute.

We avoided plunge cutting with carbides because it leads to tool breakage. We watched all tools closely for wear. Once it starts, it progresses rapidly.

Slotting

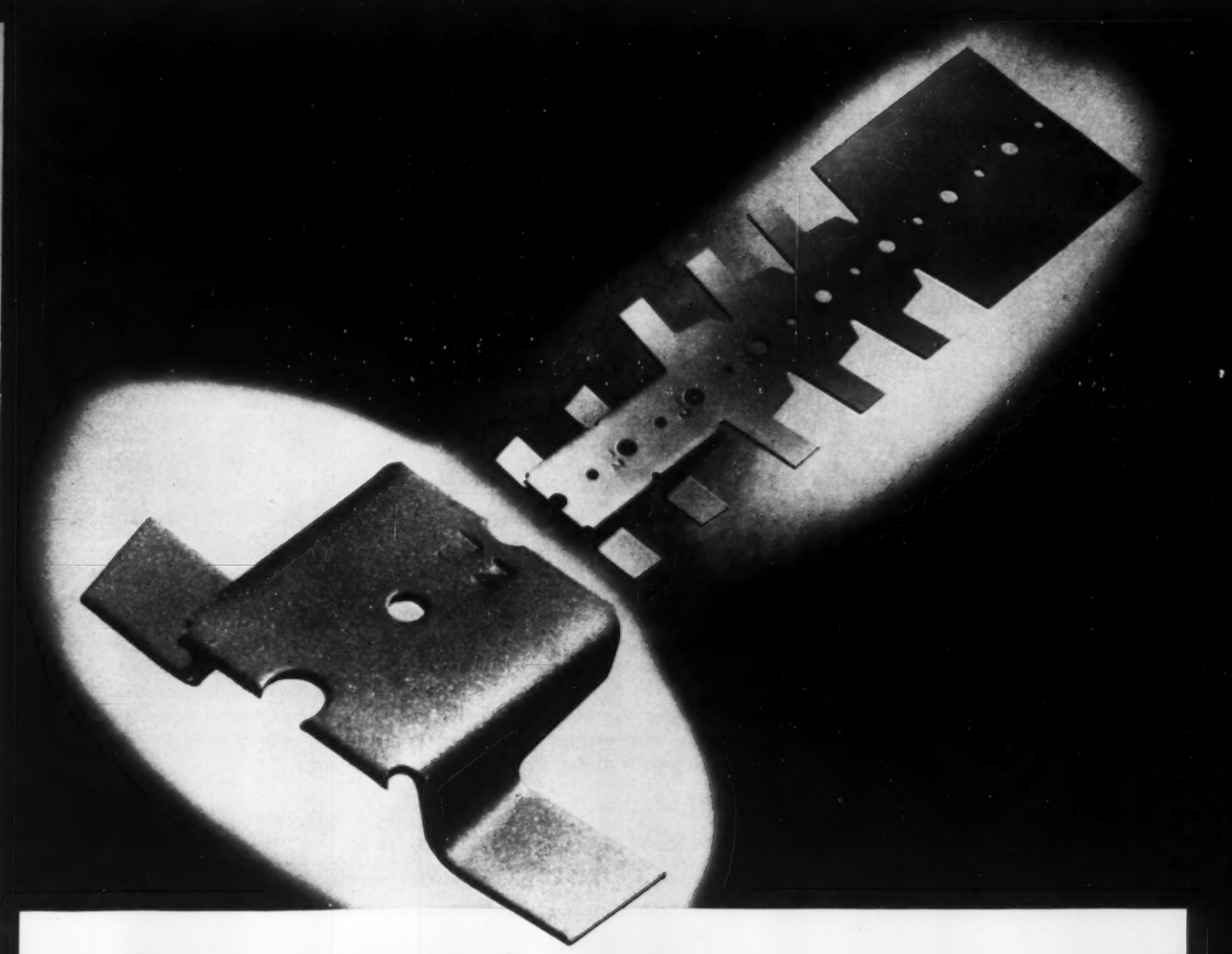
After unsuccessful attempts to slot parts with HSS and carbide slotting cutters, we went to cast alloy cutters. We first figured we would do the job on a stub arbor, but since all previous tests warned us about rigidity, we designed the tools for maximum support. We used the slotting cutter with two arbor supports and a flywheel.

Feed rates had to be held under 0.750 in. a minute, and tool life was extremely limited. Since we couldn't keep the chips from welding to the cutting edges, we mounted a wire brush on the overarm support to take the chips out and prevent their carrythrough on succeeding cuts.

Another slotting problem: Pressure of the cutter forced the sides of the part outward, causing an expansion of the slot. The addition of support blocks to the fixture corrected this condition.

Other Jobs

- We had to machine an elongated slot in another part. We used HSS end mills to plunge and elongate the slot. The end mills were flooded with sulfur base oil and were run at 35 sfpm. The setup was highly successful.
- We recently were successful in tests where we slotted forged AMS 4925 with carbide cutters. We used



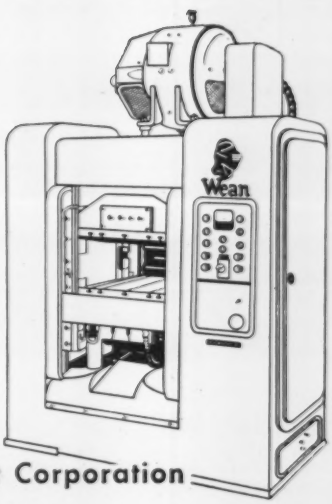
Production rate increased 400% on progressive forming operation

Production Rate: **Conventional Press — 75 pieces per minute**
Wean "Flying-Press" — 300 pieces per minute

This small progressive forming is called a keeper plate. It is stamped and formed out of .035 gauge strip steel. Length of index is 3". This part was produced on a conventional press at the rate of 75 per minute. Using the same dies, a Wean "Flying-Press" increased production to 300 parts per minute.

But ultra high speed production is only one facet of the revolutionary "Flying-Press". Average set-up time for example is at least 25% faster than for conventional presses. A single upper bed adjustment plus a jog button on the central control panel speeds actual die setting and at the same time provides an important safety feature.

But why not get the complete story by writing today for your copy of the "Flying-Press" Brochure.



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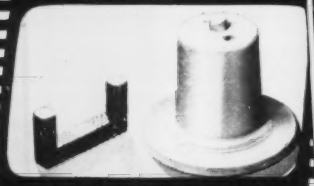
322

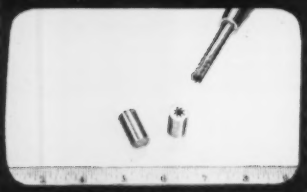
Nothing is too HARD to be Machined by

Sheffield's CAVITRON

Carbide blanking die and the Cavitron tool used to sink it.

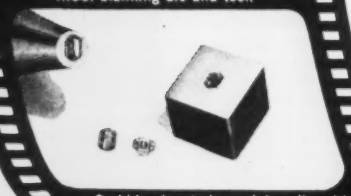


Ferrite yoke slotted after sintering and glazed porcelain in which three round and one square cavities were sunk.



H.SS. lockwasher die blank, die and the tool which produced it.

H.SS. blanking die and tool.



Carbide signet ring coining die with finished ring and Cavitron tool.

Cavitron is an ultrasonic tool by which even the hardest materials are machined readily, accurately and economically. And without regard for their electrical characteristics.

Because no heat is generated by the machining process no change is produced in physical properties of the material machined.

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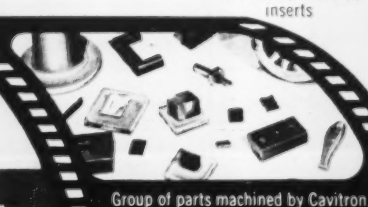
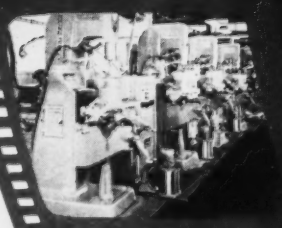
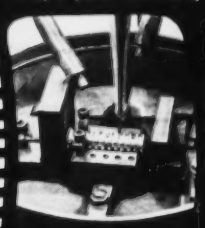
MACHINABLE MATERIALS	MACHINING OPERATIONS	PRODUCTS PRODUCED
Hardened tool steel	Drilling—boring	Dies, steel and carbide
Cemented carbides	Contouring—Engraving	Machine and motor elements
Ferrite—Germanium	Slicing and dicing	Electrical and electronic components
Cermets—ceramics—glass	Tapping	Jewell bearings—tools
Aluminum oxide		Tire molds—carbide inserts
Precious stones—quartz		



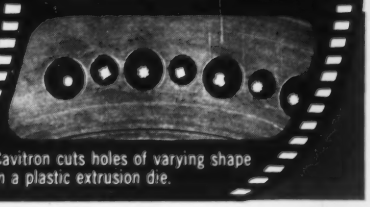
Group of parts machined by Cavitron.



Group of Cavitron machines in assembly.



Sinking diamond shaped ports in a servo valve sleeve.



Cavitron cuts holes of varying shape in a plastic extrusion die.

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TITANIUM MILLING . . .

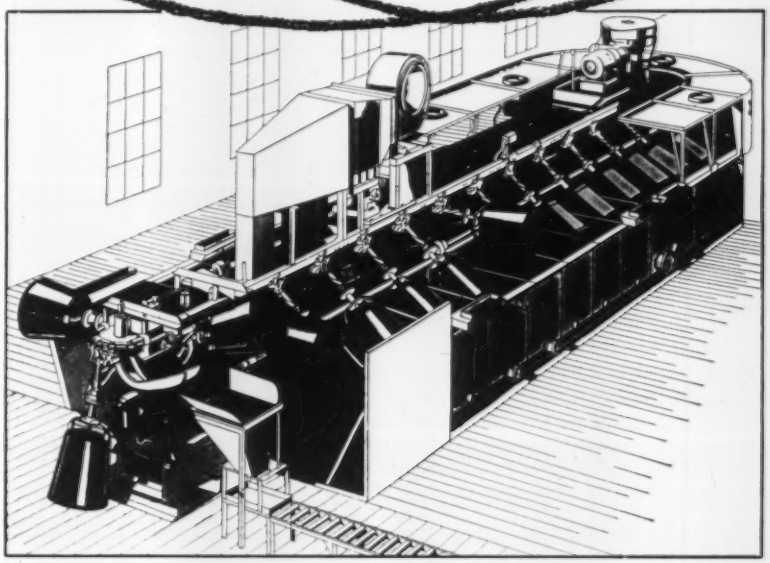
14-in. stagger tooth cutters with a full radius, 0.375 in. wide. The cutter was tipped with C-2 carbide with a 5-degree radial rake and 15-degree axial rake. Speeds were 67 to 154 sfpm; feeds were 1.5 to 6.375 in. a minute. Depth of cut was 0.20 to 2.625 in., and the part was flooded with sulfur base oil.

Guideposts

Here are lessons we've learned:

1. Avoid butt mill applications with HSS or carbide cutters.
2. Use helical carbide slab mills. We recommend 45 degrees.
3. For carbide end and slab milling, 80 to 120 sfpm is recommended with chip loads in the 0.005 to 0.015 in. range.
4. Apply coolant liberally . . . use sulfur base oil flow or spray mist.
5. Insure the removal of chips to eliminate carrythrough on successive cuts.
6. Check closely on cutting wear, removing dull tools immediately.
7. Use a conventional cut when scale is removed.
8. Avoid plunge cuts with carbide end mills.
9. Add hardened plates to fixtures when the part contact area is small.
10. Add backup blocks to support the part when the cross section is small in relation to part length.
11. Use clamps at frequent intervals, clamping as close to the machining area as possible.
12. Design all fixtures for maximum rigidity.
13. If cast alloy cutters are used, run them at 80 to 100 sfpm with a 0.002 in. minimum chip load.
14. HSS cutters should be run at 30 to 50 sfpm with a 0.002 to 0.005 in. chip load.
15. Avoid carbide slotting cutters.
16. Use double arbor supports and flywheels placed close to the work when possible.
17. Don't use stub arbors for arbor type slotting and facing.
18. Don't stop milling cutters while they're in the cut.
19. Don't use carbide end mills for profiling when the length of contact between the part and the side of the tool exceeds two-thirds of the end mill diameter.

Barrel Plating by Stevens Really Cuts Costs



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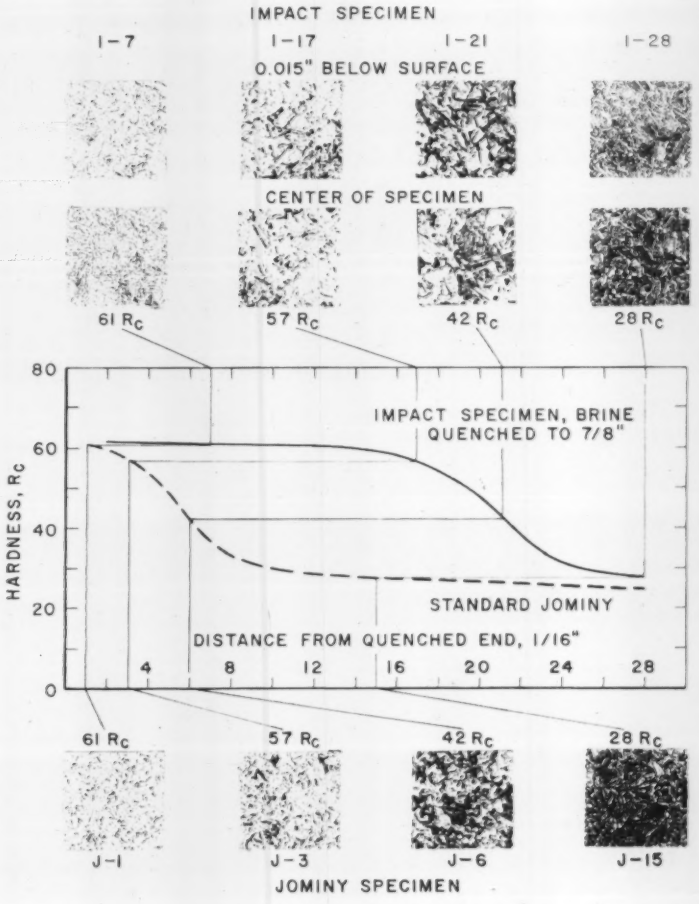
Operator holds an impact specimen at opening in quenching fixture. Second specimen (left) is already immersed in brine. Metal straps hold steel plate fixture in position



This graph shows correlation of hardness and microstructures on impact specimen and standard Jominy bar. Note that microstructure of impact specimen is uniform from just below surface to the center

Test Reduces Overdesign Problem

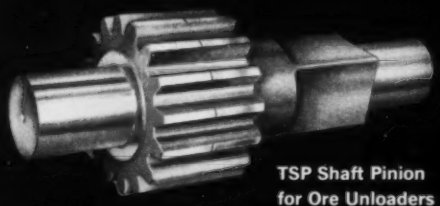
New method measures impact properties of slack quenched steels, says National Bureau of Standards. It's hailed as boon to fabricators of thick sections

THE National Bureau of Standards has come up with a test procedure that will be good news to fabricators who use thick sections of steel. It promises to reduce "overdesign" costs.

The Problem—Steels cooled too quickly during heat treatment aren't uniformly hard from surface to core. Called slack quenching, the effect can't be avoided in large sections of unalloyed steels. Heat isn't removed fast enough from the interior to complete hardening. Microstructure and mechanical properties vary throughout cross sections.

The impact resistance of the metal is reduced, but accurate measurement hasn't been possible. To avoid risk, fabricators often overdesign or substitute deep hardening alloy steels for less expensive carbon types.

Method — The new procedure uses a Charpy (V-notch) impact specimen which has been end quenched by immersion. A series



TSP Shaft Pinion
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TSP Screw Down Screw and Nut for Blooming Mill

TSP Cone Crusher Gears

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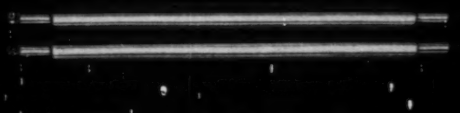
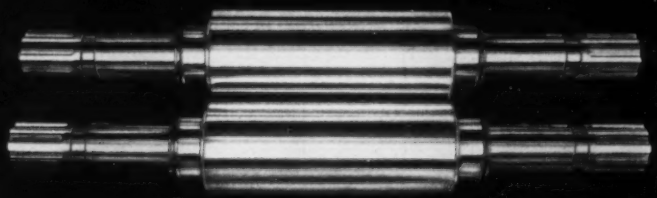
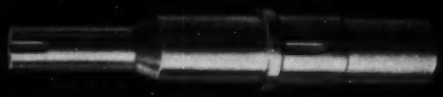


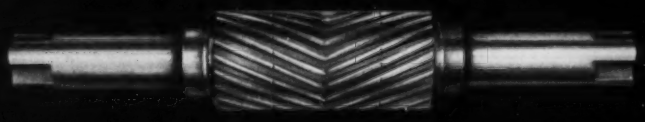
TSP Leveller Rolls for Steel Mills



TSP Rolls for Steel Mills

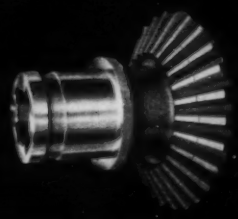


TSP Crane Wheel Axles

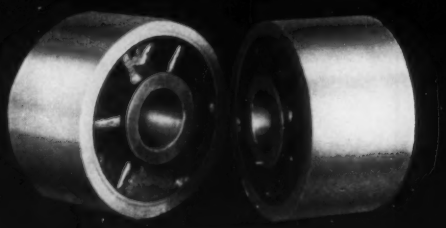


TSP Pinions for Steel Mills

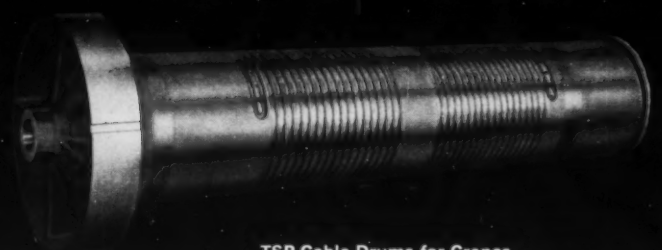
TSP Sprockets



TSP Edging Mill Bevel Gears



TSP Trunnion Rolls for Kilns



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of planes with differing but predictable microstructures and hardnesses is formed. They vary with distance from the quenched end.

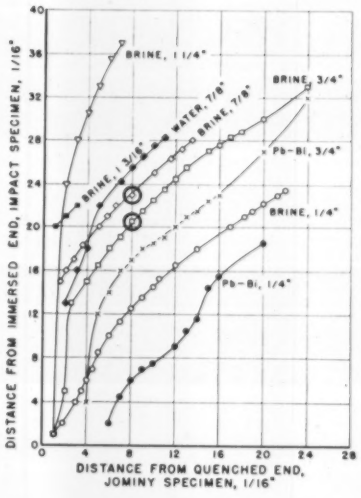
Depth of immersion and quenching medium are predetermined from Jominy data on the same steel. Standard bars are quenched according to ASTM specifications. A hardness survey along the length of the bar is correlated with microstructures. You can use the graph (Page 184) as soon as the desired hardness or structure is located in the Jominy bar and distance from the quenched end is established.

Example—Suppose you want to study the impact properties of a steel which has the microstructure that's located 8/16 in. from the quenched end of a Jominy bar. Refer to the graph (below) and you'll find that an impact specimen immersed 7/8 in. in brine will have the same hardness and structure 23/16 in. from the immersed end.

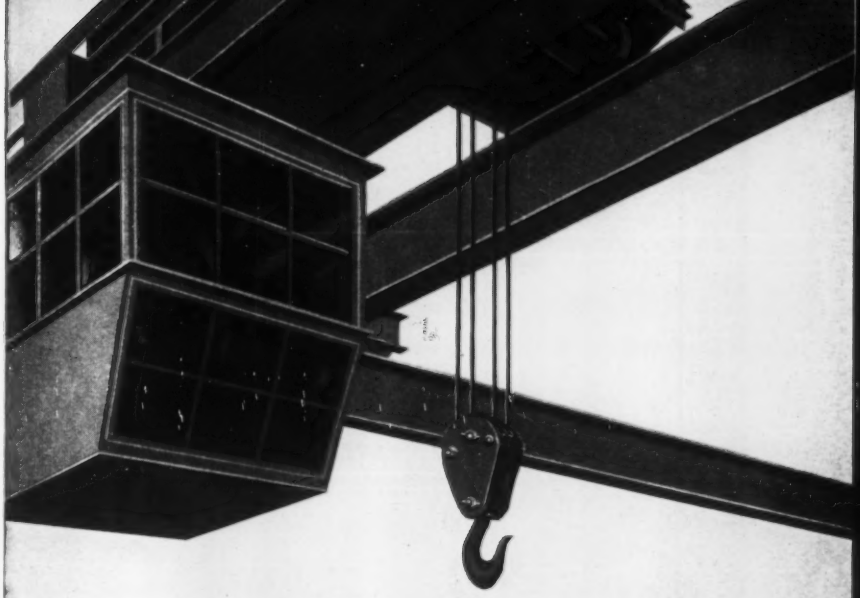
If you select a 3/4 in. immersion, the structure you want appears at 20/16 in. from the quenched end. (Either immersion depth can be used since impact test notches are close to the center of a specimen and at least 1.08 in. from the quenched end.)

Preparing Specimens — Impact specimens are rough machined 0.42 in. square by 2.56 in. long, which allows for scaling, decarburization,

(*Please turn to Page* 190)



Plotted points are locations of equal hardness and similar microstructure



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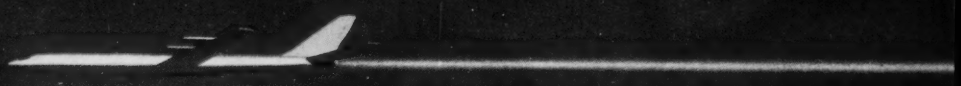

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QUENCHING . . .

and latitude for notch location. One end is drilled 0.25 in. deep and tapped with a ¼-20 thread.

Specimens are supported by a 2 in. screw and washer assembly (photo, Page 184). The washer is held in place by two nuts. It can be moved up and down the screw to vary the distance the specimen will be quenched. The quenching fixture has eight 0.66 in. holes which are large enough to pass the impact specimen but hold the washer. Metal straps hold the fixture.

Machining — After quenching, specimens may need a low temperature (250° F) stress relief to inhibit cracking. They are ground equally on all sides to remove any scaling or decarburization.

A hardness survey on one face locates the desired slack quenched structure. A standard V-notch is cut at that point. The impact specimen is then cut off 1.08 in. on each side of the notch. (Total length: 2.16 in.)

Impact resistance of that plane can be determined by a Charpy impact test.

Uniformity—During exploratory work, bureau researchers end immersed specimens of a commercial steel (0.28 C, 1.6 Mn, 0.0015 B) to several levels. Hardnesses and microstructures at various positions were correlated with those in a standard Jominy specimen of the same steel.

Repeated checks of impact specimens showed that the hardnesses and microstructure of planes parallel to the quenched end were consistently equal and similar. A look at the curves for impact specimens showed that any hardness in a Jominy bar could be duplicated in an end-immersed impact specimen (the cooling rates must correspond).

Versatile—The bureau's method is suitable for tempered as well as untempered slack quenched structures. In such studies, the specimen is given a predetermined tempering after locating a particular slack quenched hardness on the untempered specimen. After tempering, the notch is cut and impact strength determined.

Alloy Effect—Data from the bureau also show the detrimental effects of various degrees of slack

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QUENCHING . . .

quenching of the impact properties of triple alloy steels (nickel, chromium, and molybdenum). They also show the influence of varying carbon and alloy contents on impact properties.

Logic — In developing the test, bureau experts reasoned that impact specimens with slack quenched structures could be prepared like Jominy bars. They are hardened by a jet end quench.

In theory, Jominy bars contain an infinite number of parallel planes. Assuming no surface cooling, each plane is cooled at a constant rate. Speed decreases as distance increases from the quenched end. The result: Each plane has a different hardness and microstructure.

Equipment—All tests were made on a Charpy impact tester of 224 ft-lb capacity. The machine conformed to ASTM standards except that the radius of the striking edge was 0.047 in. instead of 0.315. All finished specimens were 0.394 square, 2.165 in. long. Notches were 45 degrees, 0.079 in. deep with a root radius of 0.010 in. Test temperatures varied between minus 320 to plus 300° F.

Summing Up — The bureau makes these observations about its method:

1. Under equal testing and treating conditions, impact properties of the higher carbon, lower alloy steel were always inferior to those of the lower carbon, higher alloy steel, regardless of the amount of boron present. Tempering reduced the differences and raised impact values.

2. The higher the hardness to which a steel was slack quenched, the lower the impact properties. Tempering reversed the condition.

3. The impact properties of all slack quenched steels tempered to Rockwell 40 were improved by tempering to Rc 30.

4. At equal hardness levels, the impact properties of the slack quenched steels (tempered or untempered) generally were inferior to fully hardened and tempered steels. Impact properties of tempered, slack quenched steels were only slightly affected when initial hardness was close to maximum. Deterioration was more pronounced when initial hardness was lower.

Soft water saves wives

N. J. Cornwall, Ass't Gen. Manager, Tanks, Inc., manufacturers of galvanized water softener tanks.

This man saves money making water softener tanks with Sciaky Resistance Welding Techniques

Among wives, Norm Cornwall would be rated a wife saver, but at Tanks, Inc., he's a money saver because his production is smooth and almost completely trouble-free. And his manufacturing costs are so low that customers such as SERV i SOFT can offer their water softener rental service at really competitive prices!

Why don't *you* get the facts on how Sciaky resistance welding techniques can simplify your metal parts assembly and lower your unit costs at the same time . . . just as Mr. Cornwall did!

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You can read the details of this application on the next page . . .

Resistance Welding Galvanized Steel

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The Economy of Seam Welding Galvanized Tanks in Limited Production

Questions frequently arise as to the practicality of resistance welding galvanized steel. However, Sciaky Resistance Welding Techniques have proved it can be done safely and economically.

The effect on zinc coating

In spot or projection welding the zinc coating remains intact when the correct Sciaky techniques are employed. In seam or flash-butt welding the zinc on the outer surfaces is removed. However, the corrosion resistance is easily restored by coating the surfaces with a priming paint such as aluminum in the way Tanks, Inc., does it. The efficiency of the Sciaky resistance welding process more than offsets the extra painting operation.

Seam welding galvanized tanks

In the Franklin Park, Illinois, plant of Tanks, Inc., Ass't Gen. Manager, Norm Cornwall, has developed a simple but efficient process for joining bottoms to shells in the manufacture of galvanized tanks.

A single operator, employing Sciaky resistance welding techniques, inserts the bottom in the shell, welds it, and restores the protective coating at a rate of 55 per hour.

The manufacturing sequence

Figure 1 shows the first operation in which the operator drives the bottom into the shell with a hammer. In actual practice he performs this operation and the third operation while welding is in progress.

FIG. 1 Operator inserting tank bottom into the shell.

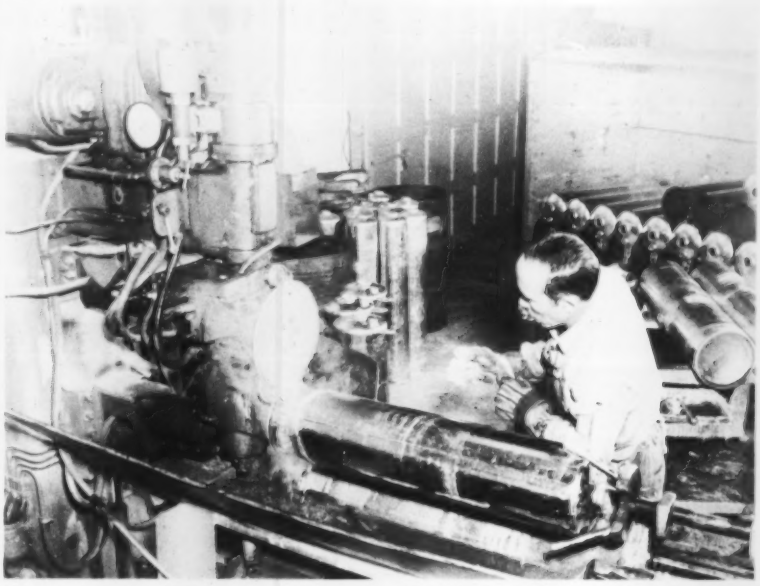

FIG. 2 Sciaky Seam Welder joins the bottom to the shell.

The second operation is the welding. The operator first makes a short (1") tack seam weld on the side of the shell opposite the longitudinal seam of the tank.

The tack welded assembly is then placed in the Sciaky welder and clamped in position by an air actuated fixture. The weld is started adjacent to the longitudinal seam of the shell and the operator helps it over this enlarged section. After this the welding proceeds unattended at a speed of 37.5" per minute with a spot spacing of 15 per inch. (See Figure 2). After completion of the full 360°, the operator allows the welder to continue and reweld over the longitudinal seam. This practice minimizes the danger of "leakers".

In the third operation the operator paints over the seam weld with aluminum paint to restore the corrosion resistance of the seam.

Information available

Case histories outlining the successful use of Sciaky Resistance Welding Techniques on galvanized material are available on request. An engineering report on resistance welding of galvanized steel is also available. Specific recommendations will be furnished on receipt of an outline of your requirements.

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DO YOU HAVE A RESEARCH PROBLEM?

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HIGH-SPEED heating of diecast rotors for fractional horsepower motors is the feature of a new Gradiation furnace developed by Selas Corp. of America, Dresher, Pa.

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Sizes—Rotors range up to 4 in. OD by 4½ in., high, including diecast aluminum end rings and fan blades.

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Timing is varied to fit the rotor size.

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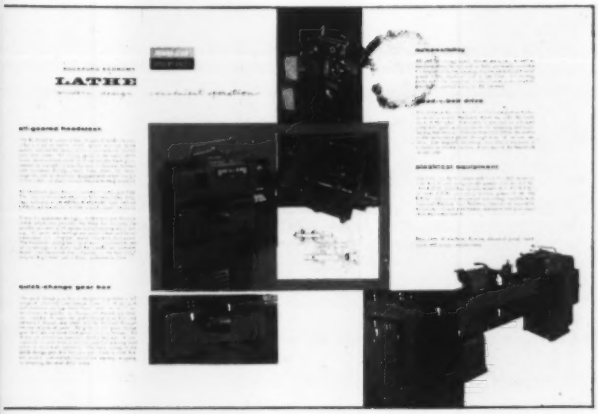

This completely new booklet contains photos, description and drawing of the all-geared headstock with quick-change gear box, standard construction features, and description of spindle, carriage, apron and taper attachment, together with a complete list of specifications and extra equipment.

Every methods and process engineer should have a copy for comparison of production and accuracy lathe values. This bulletin also makes it easily apparent how to specify lathes equipped to meet specific production problems through selection of size, feed and speed range, and electrical equipment. Full description is also available on tracer controlled operation with the Rockford Kopy-Kat Duplicator.

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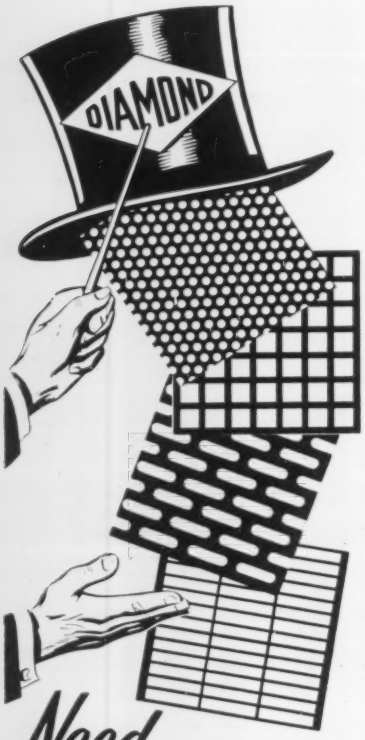

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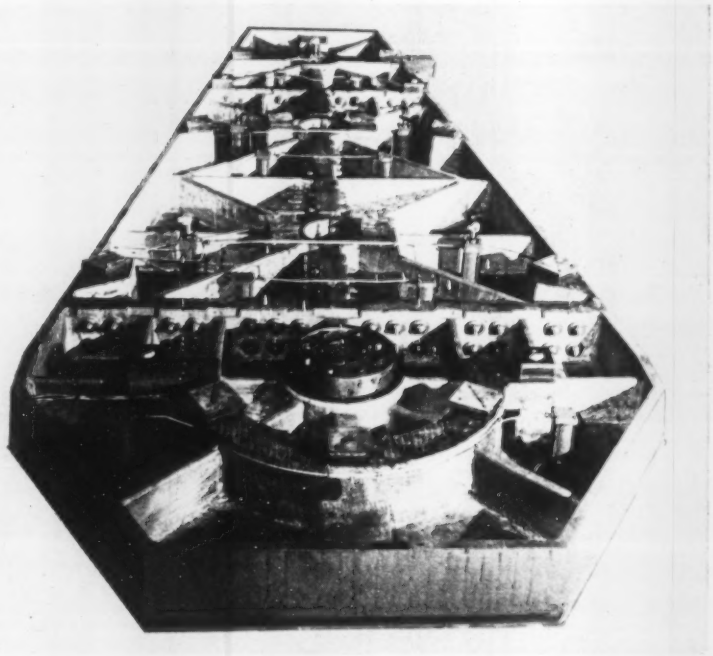

Alcoa's King-Size Casting

THE 25,000-lb cast aluminum assembly pictured above is said to be the largest ever produced. Aluminum Co. of America cast it in four sections at its Cleveland sand foundry for North American Aviation Inc., Columbus, Ohio.

The chuck assembly is part of a fabricating table which will hold wing panels for precision milling. The chuck is 28 ft long, 130 in. at the widest point, and 16 in. deep. The heaviest of the four castings weighs 7500 lb.

Called for Switch — Previous equipment of this type was fabricated from ferrous alloys. North American specified aluminum because the ferrous chuck called for by the design would have been too heavy for the foundation prepared for it.

Other advantages pointed out by Alcoa: 1. Aluminum's ease of machining. 2. Its cost of machining was about half that of steel. 3. Its greater handling ease. (The installation required only one-third the usual time.)

Production Steps — Machining tolerances at the chuck surface were held to $\pm$ 0.002 in. to insure that the finished part was held to $\pm$ 0.005 in. Dimensionally stable castings were obtained by the use of an air blast quenching technique.

Six thermocouples, attached to a recording device, were placed at strategic points in each of the molds. By referring to the readings from these instruments, the rate of cooling was studied to determine the soundness of the part.

Each casting was fed molten aluminum for more than 30 minutes to compensate for the contraction of the cooling metal at the center of the section.

Alloy Used—Alloy 355-T7 E9 was selected because of its good castability, hardness, and strength in a stable temper. It contains silicon, copper, and traces of magnesium. The designation T7 indicates solution heat treatment and stabilization to control growth and distortion. E9 is an experimental designation for Alcoa's air quenching technique.

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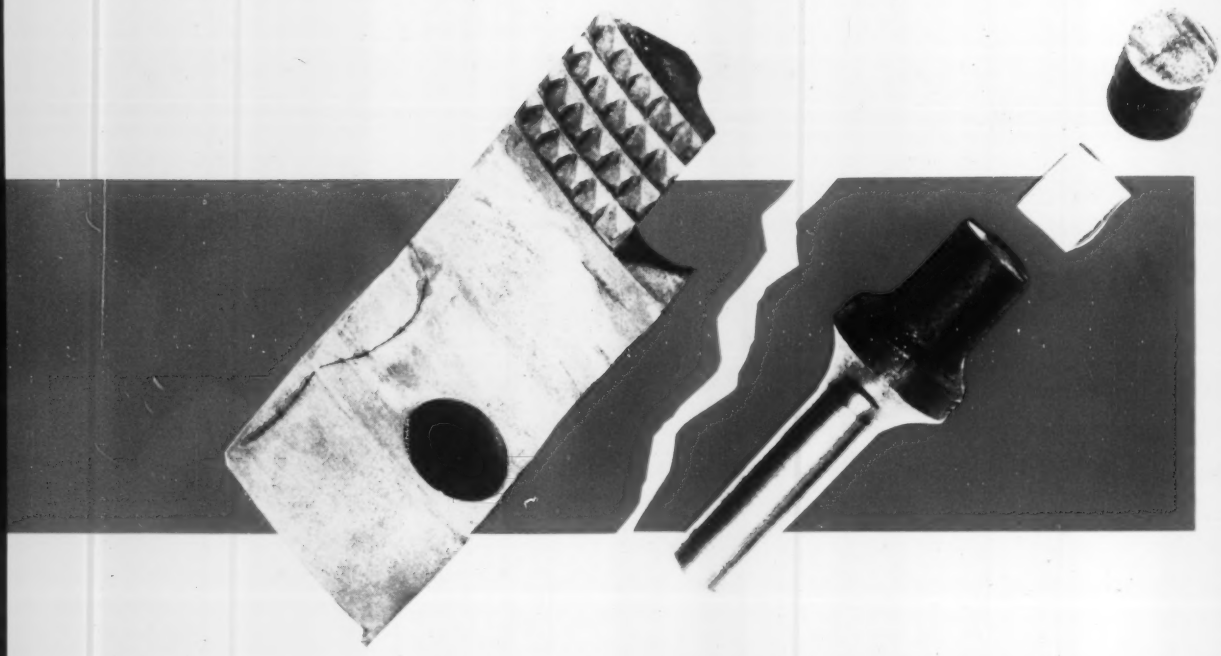


Fig. 1. Chuck jaw (left) and rivet set (right) failed because of decarburization of outer layer, which acts as a nucleus for fatigue failure. Shank was ground free of decarb

How To Avoid Cracking Die Steels

Too much or too little surface carbon can be at the bottom of cracked and spalled tools. Concluding installment of two-part article highlights heat treatment and material selection

PART TWO

IT is important to control the amount of carbon in the surface of a steel undergoing heat treatment. Most operators are aware of the hazards, but cracking is still found because of inadequate control.

In the first article (STEEL, Sept. 30, p. 79), we discussed the effects of die design and machining on cracking. Heat treatment and the proper selection of steels are equally important.

HEAT TREATMENT

An example of surface decarburization is the internal expanding chuck jaw in Fig. 1. The quench cracks start at the base and progress up and over the tapered body, finally running out to the edge at the center.

This is not a complicated design, particularly for an oil-hardening grade. Many similar jaws have been hardened successfully.

Laboratory examination indicates perfect grain size but a uniform decarburization 0.025 in. deep on all surfaces. Further investigation disclosed a cracked manometer tube on the air-gas ratio panel. The readings were much in error.

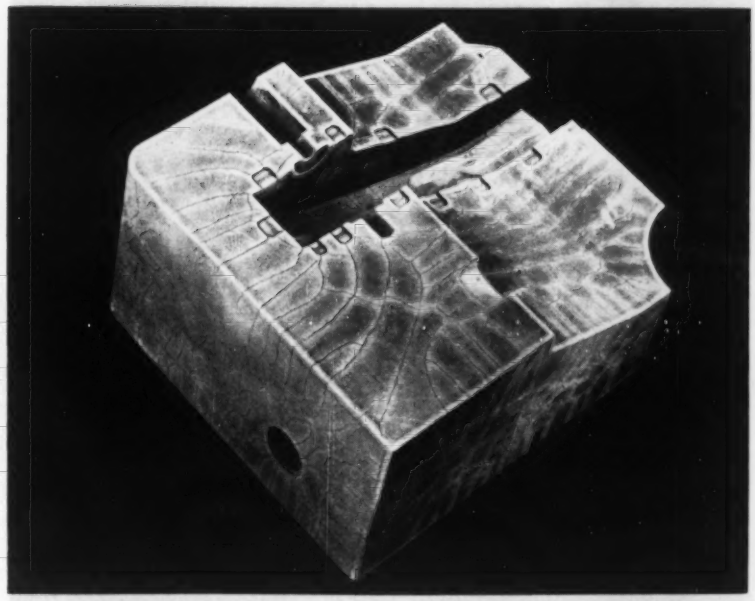
Also in Fig. 1 is a failed rivet set made from silicon molybdenum, water hardening tool steel. The shank has been ground smooth, and there is ample fillet above the neck.

The working end has not been ground. It's a good example of not preventing decarb. Remember that decarburized surfaces often act as nuclei for fatigue failures.

Preventive Methods—Controlled atmospheres, salt baths, or other types of equipment can prevent decarburization. If they aren't available, most tool and die steels will harden without decarb packed in a neutral compound such as cast iron chips.

Reverse Is True — Be sure the packing is neutral. Excessive carburization is as great a crack hazard as decarburization.

The tube piercing mandrel in Fig. 2 was made from a standard 5 per cent chrome, hot work steel. It showed signs of heat checking after piercing only 50 billets. The



Excess Surface Carbon

THE diecasting tool in the illustration failed during heat treatment because of too much carbon in the surface. Here's why:

The die was made from a hobbing grade of 5 per cent chrome, hot work steel. Hobbing is more economical than machining, but the surface of that kind of steel requires carbon enrichment to improve resistance to erosion and washing.

The die was carburized in an energized compound. Normal practice calls for treatment in a lean atmosphere or a weak carburizing compound.

The die surface absorbed carbon rapidly, a reaction common to higher alloy, carburizing grades of steel. The rate of absorption was faster than inward diffusion. Results: 1. A thin surface layer, high in carbon (up to 2.5 per cent) and extremely brittle. 2. A zone of retained austenite over a transition zone containing some coarse, needle-shaped, martensite.

Such a combination has varying rates of expansion and contraction which caused cracking during heat treatment.

trouble was traced to inadequate heat treating furnaces and poor judgment.

The furnaces had no atmosphere control of any kind. The logical step was packing to prevent oxidation. Instead of a neutral compound, the tool was packed in an energized medium which highly enriched carbon on the surface.

An important point: Most hot-work steels are designed around a low to medium carbon content for a specific purpose. Any appreciable increase in surface carbon content is likely to cause trouble, usually heat checking.

Excess Carbon Effects — The rollerlike part in Fig. 3 drives the hammer dies in a swaging machine It is subjected to repeated impact and severe abrasion. It was made from a 5 per cent chrome, air hardening die steel. All precautions were taken in heat treatment to prevent decarburizing.

Unfortunately, this tool was packed in a carburizing compound and soaked 2 hours at hardening temperature. The combination undoubtedly prevents decarburization, but here again is the problem of excessive carbon enrichment.

The tool was in service about 4 hours when it started to spall. After removing the part, it was etched in a solution of 50-50 hydrochloric acid. Spalling was along planes parallel to the cracks. Bruise marks or dents are clearly visible.

A microscopic study showed that the carbon pickup had produced an austenitic zone. In service, it became severely work hardened.

Harder To Detect — Carburization or decarburization can be determined by laboratory analysis. Cracking that occasionally occurs in heat treatment can't be as readily detected.

The coining die in Fig. 4 is a good example. It was made from an oil-hardening steel. During quenching, it cracked into three pieces.

The design is not dangerous or critical for an oil-hardening grade. The heating records indicated that time and temperature were normal and that the die had been heated properly before quenching.

The problem might never have been solved if the metallurgist hadn't asked the hardener to check his quenching tank. Result: Two inches of water in the bottom of the oil tank.

That is not uncommon. It is something that should be checked regularly.

MATERIAL SELECTION

Selecting the right steel may be the most difficult problem faced by the toolmaker. There are hundreds of brands. Many can be grouped by chemical analysis (as in AISI or SAE systems), but they are not strictly interchangeable because of differences in steelmaking practice and quality control. Descriptive literature is accurate but of limited use to a toolmaker faced with a problem.

System—To simplify selection, Carpenter Steel developed the Matched Set method. It is based on 12 steels divided into four groups: Water - hardening, oil-

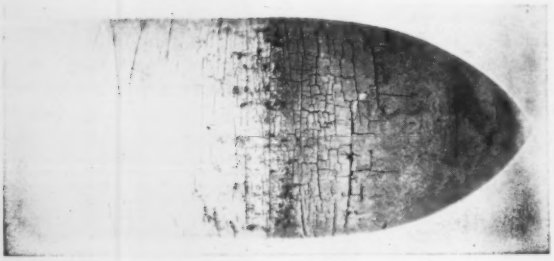


Fig. 2—Hot-work die steels are designed around low to medium carbon contents. This mandrel failed because surface was protected from decarb by packing in energizing compound which enriched surface

Fig. 3—Excessive carbon enrichment produced an austenitic zone around the periphery of this swaging hammer. Cumulative work hardening caused the cracking

Fig. 4—This coining die cracked in three pieces when quenched. Made from an oil-hardening steel, it failed because of 2 in. of water in the quenching bath

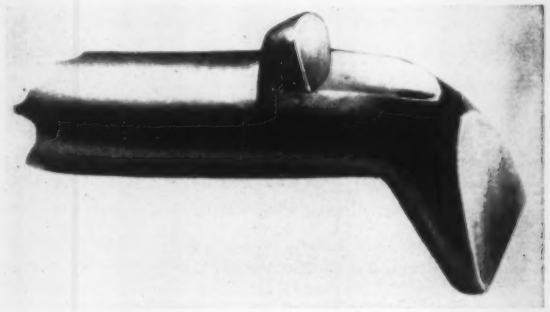


Fig. 5—Punches for shaving operations like this one break quickly. Original steel lasted a few hours. Made of Carpenter Solar (AISI Type S2), the punch lasted a week

hardening, air-hardening, and hot-work steels. There are three steels in each: One for high hardness, wear resistance, and toughness; another for wear resistance with some sacrifice in toughness; and a third for maximum toughness with slightly lower hardness.

Here are the rules which will help you choose: The starting point is a 1 per cent carbon, water hardening type. It is cheap and combines toughness and wear resistance. If you can make the tool or die from this steel without danger of premature cracking in service, there is no need to go further. Otherwise, you may want an oil-hardening steel. If it isn't sufficiently accurate and safe, choose an air-hardening type. The recommendations:

1. For all-round use: Oil hardening, manganese silicon, AISI Type 02.

2. For air hardening: 5 per cent chromium steel. AISI Type A2.

3. For hot work: Chromium tungsten steel, AISI Type H21.

Toughness—If cracking occurs prematurely in service, the three extra tough steels of the Matched Set should be used.

A good example is the shaving punch used to stake the lug on this part (Fig. 5). Toolmakers and press operators will recognize that this punch probably breaks after a few hours.

Solution—The toolmaker selected an extra tough, water hardening steel (Carpenter Solar, similar to AISI Type S2). It ran a week.

In similar applications, a nickel-chromium steel, AISI Type L6, is recommended for oil - hardened tools. A manganese-molybdenum-chromium steel, AISI Type A6, is used for air-hardened tools. For maximum toughness in hot-work steels, a 5 per cent chromium-molybdenum steel, AISI Type H13, is best.

If toughness can be sacrificed and maximum wear resistance is the primary requirement, the matched set method calls for high carbon, high chromium steel, Type D2, for air-hardened tools, and Type D3 for oil-hardened tools. A tungsten steel, AISI Type F3, is recommended for water-hardening applications, and an 18-4-1 steel. Type T1, for hot-work tools.

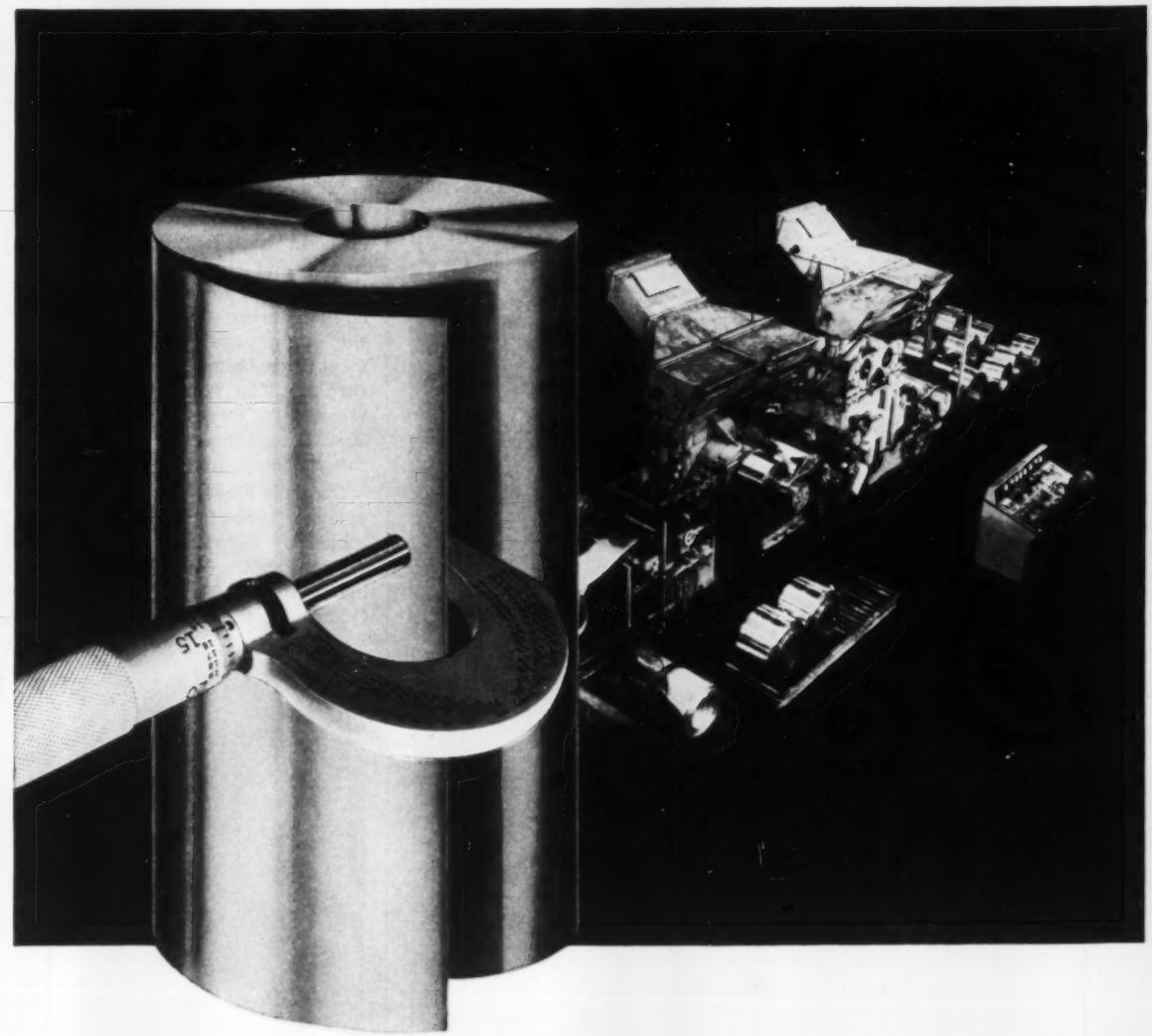
Summation—Cracked tools and dies are valueless although they may represent thousands of dollars of labor and materials. Such losses often can be attributed to poor heat treatment that could be corrected by proper maintenance and control.

Cracking hazards also can be eliminated by proper design, steel selection, and good machining practice.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, Ohio.*

When Brass Strip Tolerances Call For

PERFECTION TO THE "Nth" DEGREE



Possibly, you've never seen—or even heard of—a Sendzimir Rolling Mill like the one pictured above. Not many people have. But if you use close-tolerance brass, copper or bronze strip, you'll certainly appreciate what these high-speed, precision units can do when you order Bridgeport Sendzimir-Rolled Strip.

These mills—now in operation at Bridgeport's plants—are capable of rolling light-gauge strip into economical, long-length coils to meet the most rigid gauge tolerances.

Bridgeport Sendzimir-Rolled Strip has other advantages as well. It has remarkable uniformity of gauge and mechanical properties from edge to edge and end to end. It also has a beautiful luster—all properties you can use to advantage in your own production.

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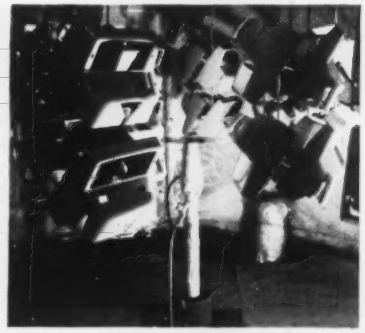

Both prime and finish coats are uniformly applied to IBM Electric Typewriter cases as they rotate around the floor-mounted Ransburg No. 2 Process reciprocating disks. Automatic Electro-Spray provides three times as many pieces per gallon as by former hand spray.

IBM's strict quality standards are easily maintained with Ransburg No. 2 Process in the painting of Electric Typewriter parts. Rejects by the former hand spray method used to run as high as 30% on some parts. Now, with automatic Electro-Spray, rejects for all reasons are only 3% to 5%.

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Indianapolis 7, Indiana

RANSBURG

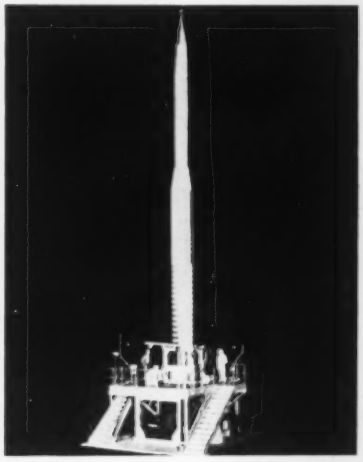
Satellite Launcher

Stand holds Vanguard rocket, weighs fuel, disconnects feed and instrument lines

THE FIRING stand in the illustration (below) will test and launch the earth satellite rockets at Cape Canaveral, Florida.

Designed and built for the Martin Co., Baltimore, by the Loewy-Hydropress Div., Baldwin-Lima-Hamilton Corp., New York, it holds the rocket precisely vertical, even in high winds; weighs the rocket and its liquid fuel during loading; supports the first stage engine during captive runs; holds the engine during nozzle adjustment (gimbaling); and measures thrust. The equipment also automatically disconnects more than 20 fuel and instrument lines when the rocket is fired.

Controls Flame—The base houses a large, curved deflector which is cooled by high pressure water. It diverts hot (4000° F) exhaust blasts from vertical to horizontal. Quenching turns them into steam.



VANGUARD
. . . shown ready for firing

The weighing-measuring system is based on four, SR-4 load cells similar to those used in strain gage weighing devices. Measurements are relayed to recorders in a distant blockhouse.

The stand is also equipped with floodlights, fog nozzles for fires, a safety shower, and eye-wash fountains for the protection of operators.

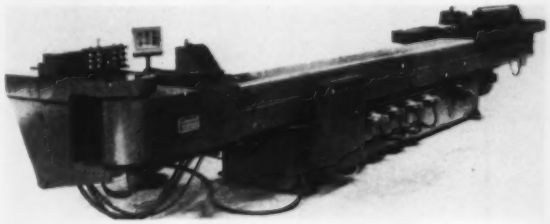
Tube Bender Combines Precision and High Production

Bendmaster Model 76 bends annealed ferrous and nonferrous tubing up to 6 in. OD and 20 ft long.

Maximums: Bend radius, 24 in.; bend, 180 degrees.

The hydraulic machine performs the entire preset bending cycle automatically in one electrically controlled operation.

The bender is 23 ft long and weighs 14,500 lb. *Write*: Leonard Precision Products Co., 9200 Bolsa Ave., Santa Ana, Calif. *Phone*: Westminster 5261



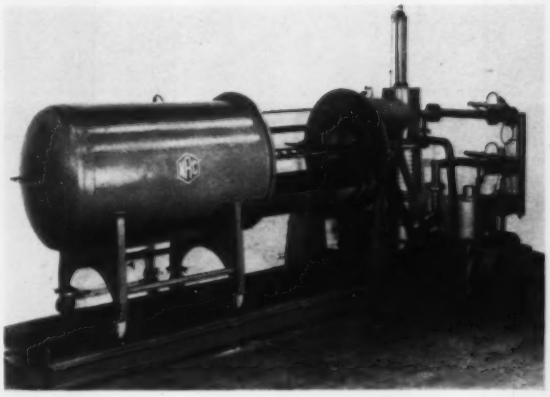
Vacuum Coater Processes Three to Five Batches an Hour

Model 3143 is an industrial vacuum coating unit which provides 12,000 sq in. of coating capacity per load. The coating chamber is 5 ft long and 42 in. in diameter.

Two filament rods and a planetary jig which accommodates four work holding rods are cantilevered from the stationary head of the chamber.

The inside of the chamber is readily cleaned by removing a strippable plastic film which takes with it accumulated deposits of coating metal.

An empty chamber can be exhausted to coating vacuum in less than 10 minutes. Measuring and control devices are centralized. *Write*: NRC Equipment Corp., 160 Charlemont St., Newton Highlands 61, Mass. *Phone*: Decatur 5-5800



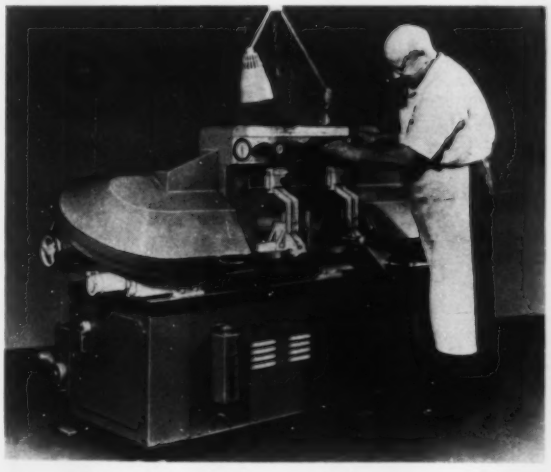
Saw Provides Blade Speeds of 40 to 360 Fpm

The Milband has a vise capacity of 10 x 10 in. Angles up to 45 degrees can be cut. The saw is designed for use with high speed steel bandsaw blades.

All machine motions are controlled from a panel at the front of the saw. Above the control panel is a chart that guides the operator in selecting correct tooth-per-inch and blade speed for various sizes of stock and types of metal.

Hydraulic blade feed maintains the value set by the operator; it automatically compensates for the greater resistance that the blade meets as it cuts into cross sections of increasing thickness. Correct blade tension is set at the factory and is automatically maintained by a hydraulic tensioning cylinder.

A flow of coolant is provided by a recirculating system. *Write*: Henry G. Thompson & Son Co., New Haven, Conn. *Phone*: University 5-0881



MINNEAPOLIS-HONEYWELL

SAVED $2,350 ANNUALLY

on one part alone when they

SWITCHED TO ALCOA ALUMINUM* SCREW MACHINE STOCK

Mr. Len Mayeron, Chief of Components and Materials Section for Minneapolis-Honeywell, says, "This hub used to be made of cold-finished, free-cutting steel. It was switched to 2011-T3 Alcoa Aluminum Screw Machine Stock and now saves $2,350 annually. Even though steel costs less than aluminum, in this particular situation, savings in machining and scrap salvage more than offset the initial material cost."

If you machine parts from steel or brass, now is the time to take a hard look at these economic facts about aluminum:

1. Aluminum costs less than brass, and machines just as fast.
2. Aluminum machines faster than steel and won't rust.
3. Aluminum scrap allowance is high.

Now is the time to switch to Alcoa® Aluminum. To help you make that switch, call on your nearest Alcoa sales office. For immediate delivery of Screw Machine Stock, contact your nearest distributor. ALUMINUM COMPANY OF AMERICA 874-K Alcoa Building, Pittsburgh 19, Pa.

HERE IS ACTUAL COST COMPARISON OF $2,350 SAVINGS ON THIS PART

Steel Cost per 1,000 parts:

78.5 lbs @ 11¢ per lb	$ 8.63
Less 64% scrap @ 1.1¢ per lb	.55
Net cost	$ 8.08 per 1,000

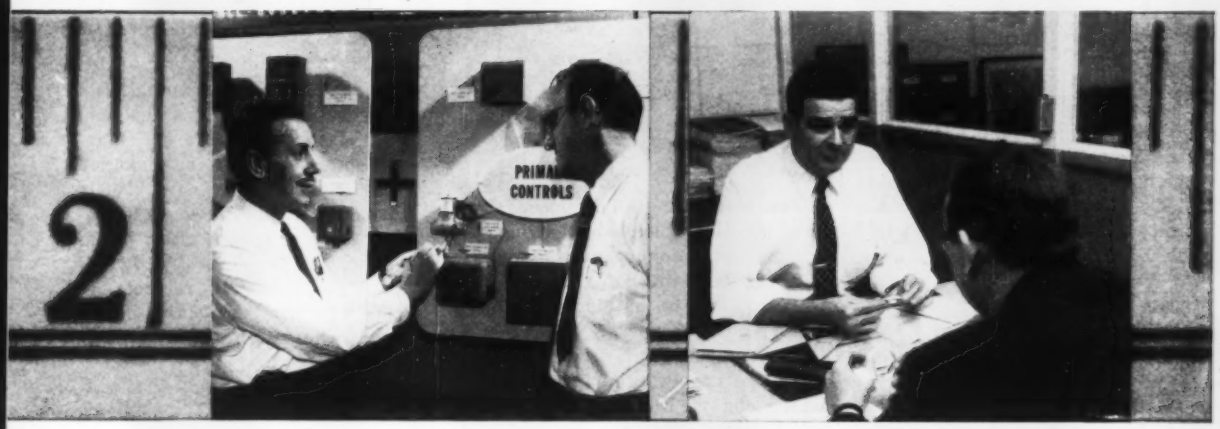
Aluminum Cost per 1,000 parts:

27 lbs @ 65¢ per lb	$17.55
Less 64% scrap @ 14¢ per lb	2.42
Net cost	$15.13 per 1,000

Steel machine time 7.86 hours per 1,000 parts.
Aluminum machine time 2.60 hours per 1,000 parts.

Labor savings 5.26 hours @ 2.265¢	$11.91
Less difference in material	7.05
Net savings per 1,000 parts	$ 4.86

Annual savings on this single-part total $2,350



IN ENGINEERING, Len Mayeron (Right), Chief of Components and Materials Section, discusses cost reduction with John Kriechbaum, Chief of Design and Development Department. Mr. Mayeron says, "We like Alcoa's technical literature and the way they pitch in and help us with production problems."

IN PURCHASING, Bill Smisek, Assistant Purchasing Agent, says, "Alcoa always meets metallurgical specifications. I seldom have had to reject their material. In emergencies, Alcoa seems to be able to find us extra quantities and give us faster than normal deliveries."

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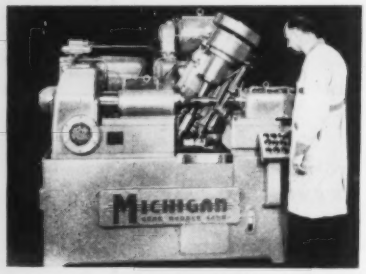
Gear Hobber

Model 1458-B is a horizontal single spindle machine with an 8-in. center distance between the hob arbor and work spindle.

Either conventional or climb hobbing may be used with single or



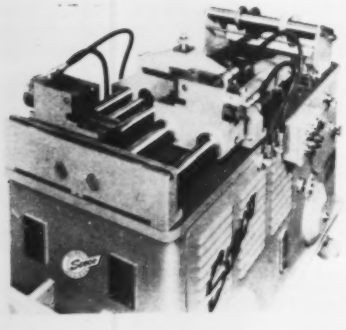
multiple thread hobs. The hobbing cycle is automatic; the machine returns to the loading position after completing a part.

A guide assembly introduces the lead to the work spindle while the work is being traversed across the hob. The guide facilitates straight gear hobbing and controls the helix angle being cut on spiral gears.

Up to four pitch spur or helical gears can be hobbed on the machine. Maximum crossfeed stroke of the hob is 5 in. *Write*: Michigan Tool Co., 7171 E. McNichols Rd., Detroit 12, Mich. *Phone*: Twinbrook 1-3111

Gripper Feeder

This twin-cylinder hydraulic feed unit can be moved from one press to another. The unit can be attached to the press to feed from the right, left, front, or back. It can be timed to feed during a preselected portion of the press cycle. The legs are adjustable for easy leveling.



The cross head consists of two grippers. Each is operated by a hydraulic feed cylinder. The cross head cylinders are sequenced: One gripper moves the stock forward, the other is returned for the next feed stroke.

Stock from 1 to 10 in. wide can be handled. Thicknesses can be up to 0.187 in. Maximum length of feed is 36 in. *Write*: Sesco Inc., 8881 Central Ave., Detroit 4, Mich. *Phone*: Texas 4-1701

Production Control

This analog computer solves manufacturing problems in production scheduling, work station impact, and similar situations.

In determining production bottlenecks, the computer can handle up to 50 products as they affect up to 24 work stations in any one problem setup.

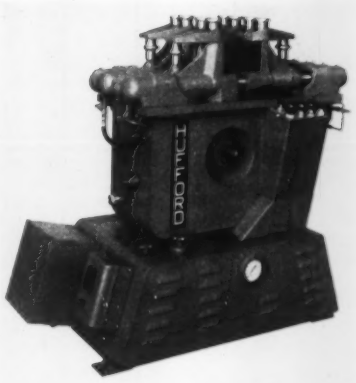
The computer can be used for any type of problem which requires the multiplication of two numbers and the summing of the results. Answers can be obtained in minutes.

The computer can determine the effects of new designs and methods which change the amount of time or number of work stations required. It can also analyze the effects of varying sales volume and costs on profit. *Write*: Computer Dept., General Electric Co., 1103 N. Central Ave., Phoenix, Ariz. *Phone*: Alpine 4-3171

Joggler Is Versatile

This hydraulically operated machine can apply an adjustable length stroke in any desired direction around a full circle in a vertical plane.

To make any joggle, the operator dials the correct stroke direction and adjusts the stroke length for thickness of stock.



Motion is imparted by an internal hydraulic ram which can be rotated end for end in a vertical plane through 360 degrees. This ram forces the slideable half of the machine in any desired direction.

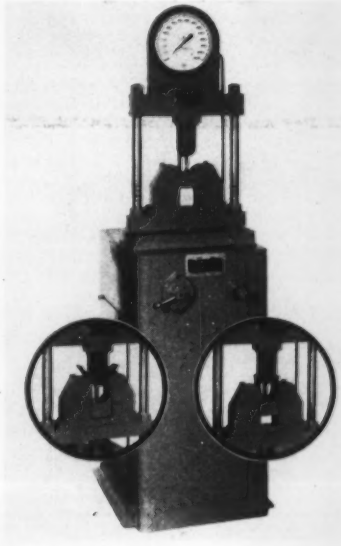
Maximum stroke length is $\frac{1}{2}$ in. Load capacity is 18,000 lb. *Write*: Hufford Corp., 1700 E. Grand Ave., El Segundo, Calif. *Phone*: Oregon 8-6221

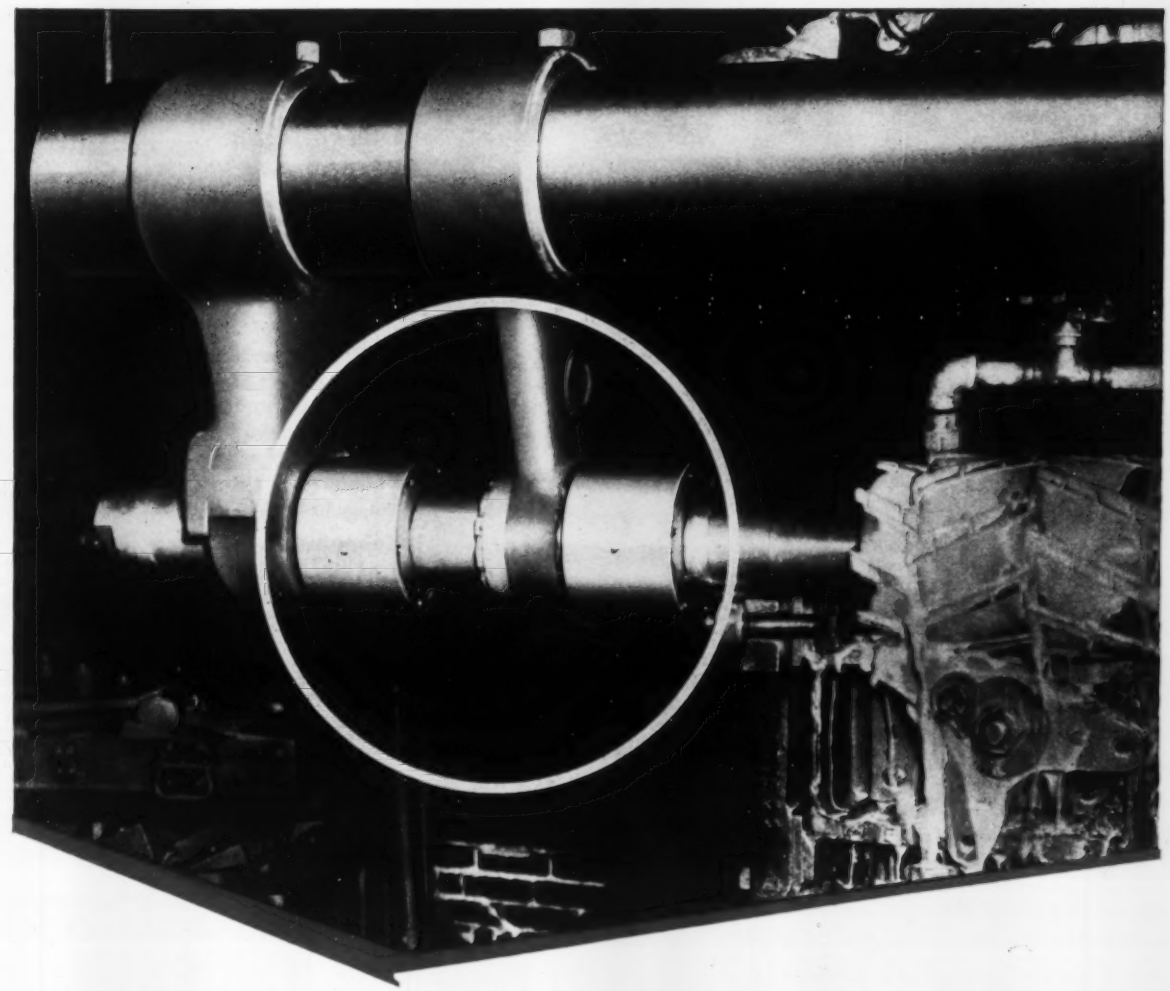
Bend Tester

Model GB-124 is a guided bend testing machine for buttwelded samples. The machine applies its own hydraulic load. It is designed so that fixtures for different thicknesses of metal can be changed quickly.

Fixtures do not have to be removed when testing a given thickness.

As the lower die retracts at the end of a test, an ejection device removes the specimen. The oper-





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Maintenance costs are reduced $25 per machine, per month, according to our customer. Cutter breakage is no longer a problem and the milling machine operator is able to hold closer tolerances, it was reported.

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Gulf Coast Bolt & Nut Co 1115 Silver St., Houston 10, Tex.
Texakana Bolt & Nut Co 1810 S. Akard St., Dallas 15, Tex.
Penn Bolt & Nut Co P.O. Box 3967, Pittsburgh 33, Pa.
BOLTS

ator needs only to pick up the specimen.

The tester has a capacity of 15,000 lb. *Write*: Steel City Testing Machines Inc., 8817 Lyndon Ave., Detroit 38, Mich. *Phone*: Webster 3-3500

Sawing Machine

This variable speed saw has a stroke of 5½ in. Speeds range from 50 to 150 strokes a minute.

Maximum capacity for straight cutting is 6¾ x 6¾ in. At a 45-degree angle the maximum capacity is 4 x 6¾ in.

A compensating feeding mechanism automatically adjusts itself to the size and shape of the work. The overarm which guides the saw frame has a wide bearing span to withstand side pressures and maintain straight cuts. *Write*: Peerless Machine Co., Racine, Wis. *Phone*: Melrose 4-6609

Radiation Pyrometer

Temperatures between 1000 and 3300° F are measured by various models in this line of Land radiation pyrometers.

Radiation from the object to be measured is focused on a small aperture in front of a thermopile consisting of a bank of ten thermocouples connected in series. A variety of lenses, depending upon the application, is used to focus the radiation on the thermopile. Only 2 seconds are required for 98 per cent of full reading.

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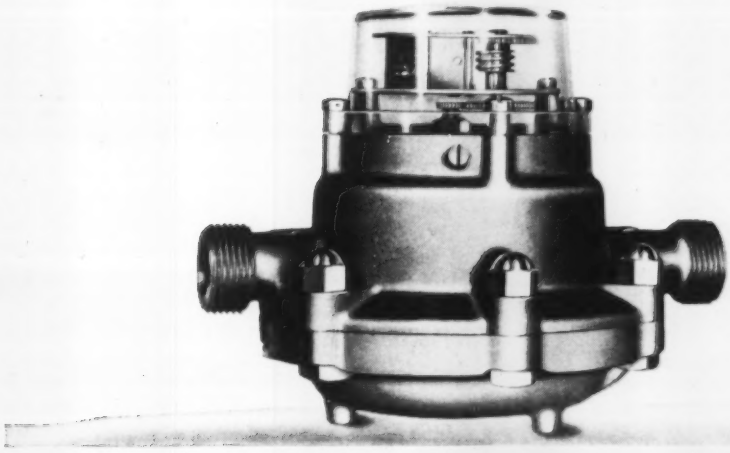
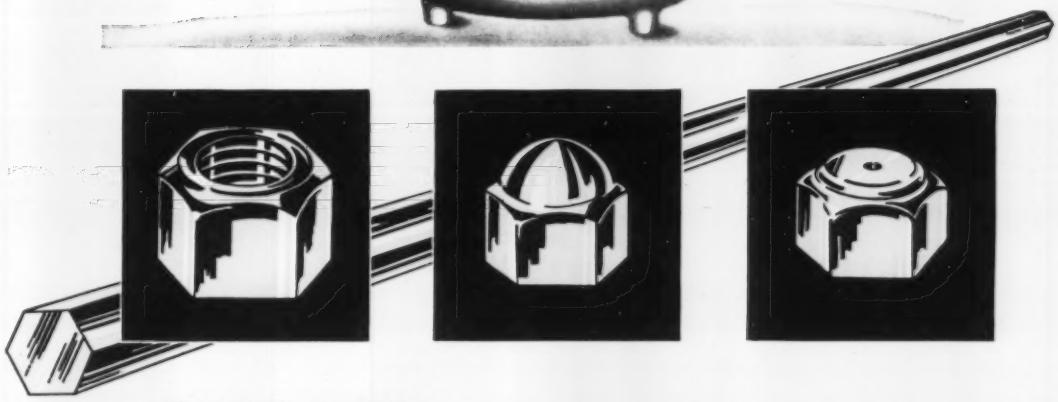
They solved a "MUSHY" machining problem at Buffalo Meter Company...





with CHASE® free-cutting brass rod!

Production runs more smoothly now at the Buffalo Meter Co.—with Chase Free-Cutting Brass Rod on the job!

Though nuts seem a simple, non-critical item, Buffalo machinists complained of "mushiness" in rod formerly used to fabricate special acorn and stuffing box nuts. Thread cutting was poor; strength of finished threads less than desired.

Chase studied the problem, and by specially modifying top-grade brass rod, came up with stock superior to any yet tried. Result: *rod that stands up to tools better...gives sharper, cleaner threads.* To quote this satisfied Chase customer: "*Definitely a noticeable improvement over that of a competitor used on the same job last year.*"

Why not have a Chase trouble-shooter look in on your shop?

Bring your production problems to... Chase®

BRASS & COPPER CO.

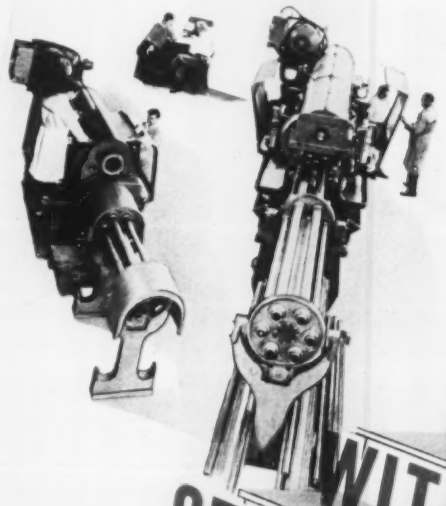
WATERBURY 20, CONNECTICUT

SUBSIDIARY OF KENNECOTT COPPER CORPORATION

The Nation's Headquarters for Brass, Copper and Stainless Steel

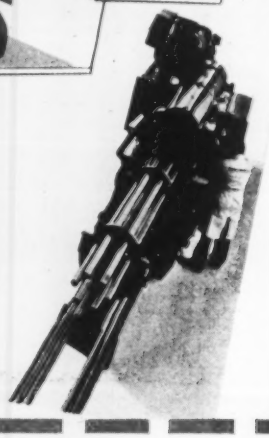
Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles Milwaukee Minneapolis Newark New Orleans New York (Maspeth, L.I.) Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

If you haven't read this important booklet, your production line may be operating at less than peak efficiency. Your operations may be beating competition with HSS today, but you will likely need carbide tooling to be the leader tomorrow.

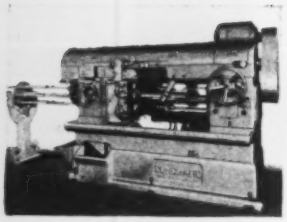


CONE WITH FOUR STEPS

CONOMATIC CARBIDE DEVELOPMENT



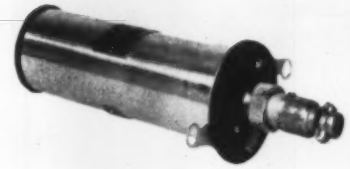
Write for your free copy of this important booklet today!



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.

NEW PRODUCTS and equipment



ond. *Write*: Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. Fourth St., Philadelphia 33, Pa. *Phone*: Garfield 6-6750

Tool Mist

Drill presses, lathes, grinders, saws, abrasive belts, and milling machines can use the Tool Mist unit to keep tools cool.

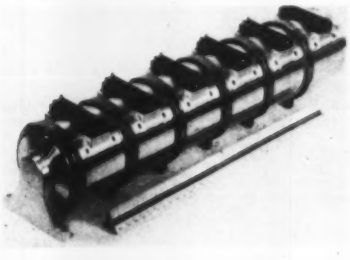
The coolant is applied with air in such a way that the coolant dissipates in the air. *Write*: Wesco Tool & Mfg. Co., 2820 San Fernando Blvd., Burbank, Calif. *Phone*: Thornwall 5-4050

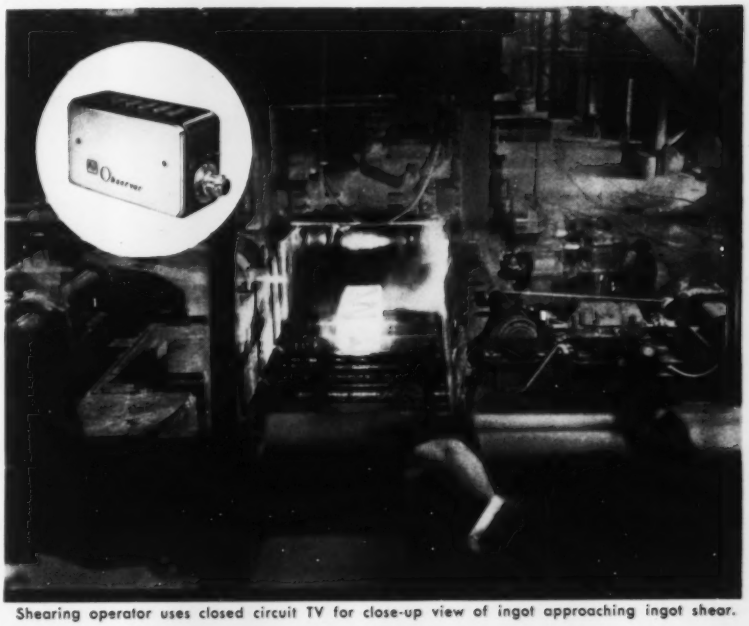
Thickness Control

This digital system for a steel mill hot line is used to control the thickness to which metal is rolled. It has a visual gage integral with the chart recorder.

Positive control is gained over the operations by using indicator lights to obtain gage settings.

Continuous printing makes management constantly aware of the





Shearing operator uses closed circuit TV for close-up view of ingot approaching ingot shear.

B-T LABS

CLOSED CIRCUIT TV AIDS QUALITY CONTROL AT SHARON STEEL'S NEW SLABBING AND BLOOMING MILL

Before the Sharon Steel Corporation decided to start work on its new $14,000,000 Slabbing and Blooming Mill at Farrell, Pa., a simulated study of the entire rolling operation was made with the aid of an electronic computer. Data from this study was used to establish the best possible mill design and saved months of field testing and adjustment.

One of the important results of this study was the decision to install B-T closed circuit television equipment at critical points in the steel-making process. B-T Observer TV cameras and other B-T closed circuit TV equipment are now being used to help mill operators maintain quality control by providing them with a closer look at key rolling and handling operations.

One closed circuit system is used by an operator to run an intermill connecting conveyer carrying steel ingots from the 'soaking pits' to the new mill. Thanks to the B-T Observer TV Camera, the operator can view the process on a TV camera and control the loading and unloading of ingots weighing up to 30,000 pounds, even though he is 187 feet from the action.

A second closed circuit TV system, utilizing the B-T Observer TV camera, is used by the shearing operator to give him a close-up view of the ingot approaching the sheer. Formerly, this man was unable to see an ingot approach the shearing operation.

At Sharon Steel, B-T Industrial TV equipment helps to maintain the high quality control standards necessary in steel-making.

In steel mills, pulp mills, power plants, in nearly every expanding industry, alert management is constantly finding new ways to cut costs and increase efficiency through the use of B-T closed circuit TV equipment.

A complete industrial TV system: B-T Observer Camera with f1.9 lens, B-T Automatic Light Compensator, monitor and cable, can be installed in your plant — ready to operate — for under $2,500.

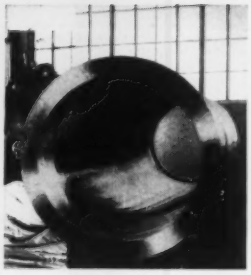
Find out how low cost B-T closed circuit TV can help your operation. There's a qualified B-T distributor in your area who will survey your needs without obligation. For further information, write Dept. ST-10.

B-T LABS

BLONDER-TONGUE LABORATORIES, INC.

9 Alling Street, Newark 2, N.J.

The Largest Manufacturer of TV Signal Amplifiers, UHF Converters and Master TV Systems.



You get greater strength . . . with

SHENANGO CENTRIFUGAL CASTINGS

Downtime, rejects, heavy maintenance costs and too-frequent replacements can be cut down *appreciably* by the use of Shenango extra-strong centrifugal castings.

They provide a finer, *pressure-dense* grain . . . with all the weakening defects eliminated, such as blowholes and sand inclusions.

Though built to stand the most rugged service, each Shenango casting is precisely-dimensioned to your exacting requirements. Whether you need rolls, bearings, bushings, mandrels, sleeves, liners, or any other essentially symmetrical part . . . *specify Shenango* for greater strength, greater wear-resistance, greater lasting power and greater savings, year after year.

Informative bulletins are yours for the asking. Write to: *Centrifugally Cast Products Division,* The Shenango Furnace Company, Dover, Ohio.

SHENANGO CENTRIFUGAL CASTINGS

COPPER, TIN, LEAD, ZINC BRONZES • ALUMINUM AND MANGANESE BRONZES
MONEL METAL • NI-RESIST • MEEHANITE METAL • ALLOY IRONS

NEW PRODUCTS and equipment

thickness settings. *Write*: Applied Science Corp. of Princeton, P. O. Box 44, Princeton, N. J. *Phone*: Plainsboro 3-4141

Cutoff Wheel

BZ2AA is a reinforced cutoff wheel for ferrous and nonferrous foundries. It is used in offhand floor stand and swing-frame applications.

The resin bond of the wheel has wearing qualities closely matched to the wearing and fracturing behavior of the abrasive grain. The

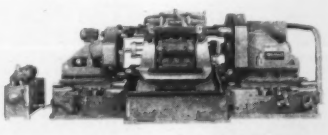
bond has chemical and heat-resistant properties that support the cutting action of the grains under extreme heat and pressure.

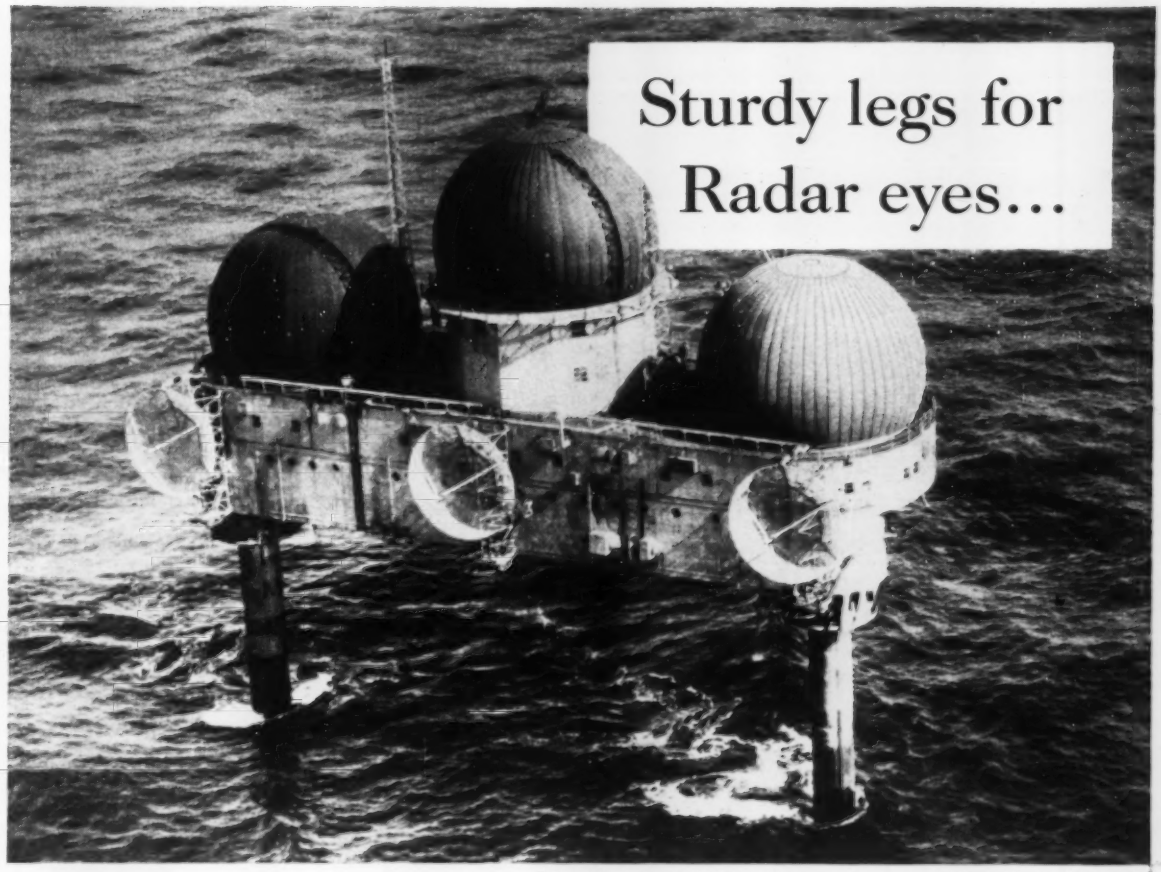
Diameters range from 12 to 20 in. Thicknesses are from $\frac{1}{8}$ to $\frac{1}{4}$ in. *Write*: Bay State Abrasive Products Co., Westboro, Mass. *Phone*: Forest 6-4423

Trunnion Machine

This six-station, two-way machine can produce 64 automotive crankshafts an hour. Four different crankshafts can be processed without fixture or tooling changes.

The left-hand head drills, countersinks, counterbores, spotfaces, and taps one hole in the front end





One of America's offshore radar warning towers—Texas Tower III—built by Walsh Holyoke Division, Continental Copper and Steel Industries, Inc.

...with each seam checked on Kodak Industrial X-ray Film, Type AA

2700 tons of island rest on these 272-foot welded caissons. With giant seas and howling gales to stand against, every seam must be sound. Radiography provided the evidence of each weld's quality.

Each weld was radiographed using a 10 curie pill of cobalt 60. And because Kodak Industrial X-ray Film, Type AA, provides greatly increased film speed, exposure times could be moderate.

While giving speeds up to twice that of the former Kodak Type A Film, this new film retains the fine sensitivity characteristics which made Type A the most widely used x-ray film in industry.

Your x-ray dealer and the Kodak Technical Representative will gladly tell you how this new film can improve your radiographic operation and help you get more out of your present x-ray or gamma-ray equipment. It can pay you to get in touch with them.

Read what the new Kodak Industrial X-ray Film, Type AA, does for you:

- Reduces exposure time—speeds up routine examinations.
- Provides increased radiographic sensitivity through higher densities with established exposure and processing technics.
- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure technics.
- Reduces the possibility of pressure desensitization under the usual shop conditions of use.

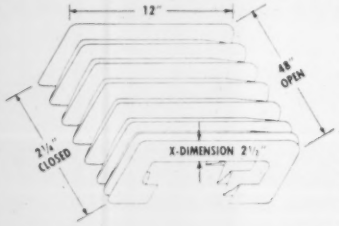
EASTMAN KODAK COMPANY
***X-ray Division*, Rochester 4, N. Y.**

For welding, Kodak Industrial X-ray Film, Types AA, M, and K, are available in the new 70mm by 550 ft. package.

Kodak
TRADE MARK

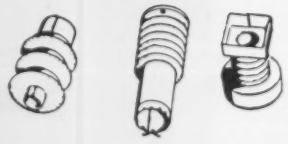
WAY-PROTECTORS

Headquarters for this new, pliable protection in America has centered at A&A. On a G&L milling and boring machine, at Harnischfeger Corporation, a set of pli-



able way-protectors — opening to 24' on both sides—has served well and continuously for eight years: Other major users include —Allis-Chalmers, Cincinnati Milling Machine, K&T and dozens more who use GORTITE protection for profit protection.

SLEEVES



1
OR
1000
WITHOUT MOLDS

BOOTS

ALL SHAPES AND CONTOURS
Bellows...Flexible Neoprene Parts

A&A Mfg. Company Inc.
712 S. 12th St., Milwaukee 4, Wis.

☐ Send bulletins on way-protectors, sleeves and boots.

☐ Ask a representative to call.

Company .....
Street .....
City .....State .....
My Name .....

NEW PRODUCTS and equipment

of the crankshaft. The right-hand head drills, countersinks, and reams eight bolt holes. It also drills, counterbores, and countersinks one hole in the rear end of the crankshaft.

The eight bolt holes are held concentric with the outside diameter of the rear end flange by piloting the bushing plate on the flange of the workpiece. *Write*: Buhr Machine Tool Co., Ann Arbor, Mich. *Phone*: Normandy 2-5646

Steam Cleaner

Model 120 is a cleaning machine that can be operated by one man. It can generate full operating pressure in 90 seconds.

The exact amount of hot water needed is fed into the compound tank to insure proper dissolving.

This solution is then fed by means of a metering valve into the steam stream.

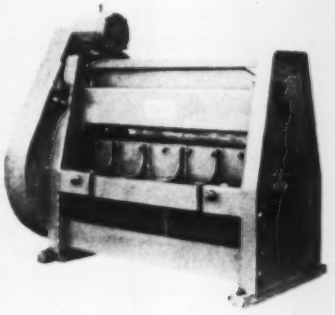
The unit will operate on kerosine, No. 1 or No. 2 fuel oil, or light diesel oil. Stationary and portable models have a capacity of 120 gallons. *Write*: Circo Equipment Co., Clark, N. J. *Phone*: Fulton 8-8600

Shear Is Fast

This shear is designed for automated lines cutting metal sheets from coil stock to specified lengths. A friction clutch provides accurate control.

When the sheet is cut, the metal lies flat from gage stop to shear blade.

Knife blade clearances can be adjusted to the gage of steel being



cut. *Write*: Dept. S, Producton Machinery Corp., 39805 Mentor Ave., Mentor, Ohio.

Torsion Spring Machine

This line of machines for making torsion springs has a camshaft arrangement which increases the production of forming work.

The camshaft is driven from the clutchshaft through a single revolution clutch which operates from a cam mounted on the crank gearshaft.

The clutch is tripped at the end of the coiling cycle. This causes a one-half revolution of the camshaft at about seven times the normal speed and increases the angular time for forming from about 20 to 140 degrees.

The slide feed grips the wire through the use of solenoids mounted on two independently operated slides.

One slide moves the cutter tube from the cutting and forming position up to the arbor, carrying the wire with it. The tube acts as a guide. The other slide then feeds the wire between the arbor and driving pin. *Write*: Sleeper & Hartley Inc., Box 1249, Worcester 1, Mass. *Phone*: Pleasant 4-3249

Alloy Pump

This air-driven pump will handle molten salt and other hot liquids up to 2000° F.

When using an air supply of 90 psi, the pump can handle 600 lb of molten salt a minute.

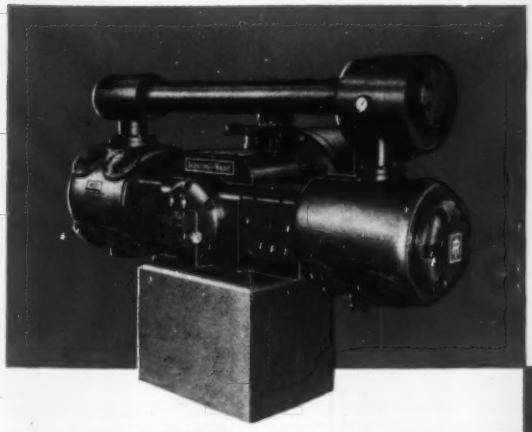
With a 60 psi supply, salt is pumped at the rate of 450 lb a minute.

The volume can be reduced as desired by adjusting the air intake valve. *Write*: Dept. NP-4, Ajax

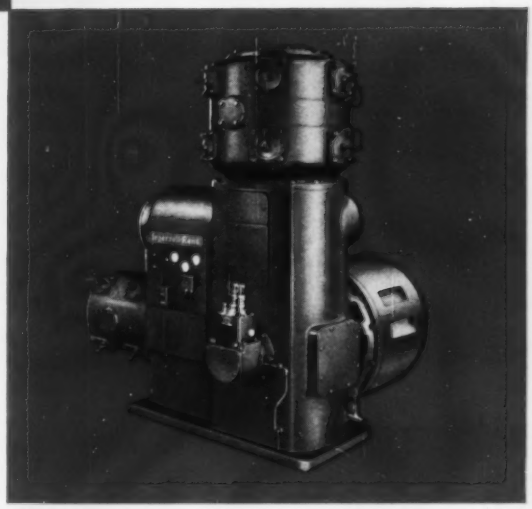
TWO READY-TO-RUN COMPRESSORS FOR

LOW-COST AIR POWER

IN YOUR SHOP



the PHE
- 75 and 100 hp packaged
- Opposed-piston balanced design



the XLE
- 125 to 250 hp packaged
- 300 and 350 hp with engine-type synchronous motor
- Thru-frame air flow

Why MODERN I-R DESIGN can reduce your air power costs and increase your production

Built tough for continuous full load, and refined for efficient performance at all loads.

Packaged, ready to run, each unit completely self-contained with crankshaft-mounted motor. Units up to 250 hp are shipped fully assembled, ready to hook up.

Full-floating aluminum bearings are foolproof, never need adjustment. They "roll with the punch" of every compressor stroke. Wear is distributed evenly around both inside and outside.

Closed crankcase never has to be opened for bearing adjustment, so dirt (the major cause of wear) is kept out of the oil.

Two-stage, intercooled compression, with I-R cylinders of proven design, makes most efficient use of horsepower.

Exceptionally smooth running balance permits small, simple foundation.

Compactness permits installation in small areas, requiring less of your valuable shop space.

CHANNEL VALVES give quiet, trouble-free operation and amazing long life due to air-cushioned action and reversible seat plates. Known all over the world for their efficiency, these valves are entirely different in design and principle from any other valve ever used. Channel valves are available only in I-R compressors.

Ingersoll-Rand

1-381 **11 Broadway New York 4, N. Y.**

COMPRESSORS · CONDENSERS · AIR AND ELECTRIC TOOLS · TURBO-BLOWERS · PUMPS ROCK DRILLS · GAS AND DIESEL ENGINES

Here's Why Square D's New Adjustable
ALUMINUM FEED-IN DUCT
makes a lot of sense to me!

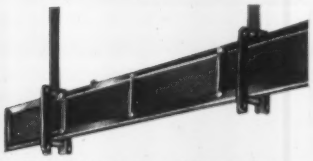
Needed-Rush!
85 feet; 3½ inches
1000 Amp, 3ϕ4 wire
Feed-In Duct

Telescoping joints with multiple slots permit infinite adjustability up to 12 inches when other than standard lengths are required. Standard elbows, T's and X's telescope up to 6 inches!

Fast delivery because any length requirement can be met with standard 3, 5, 7, or 10 foot lengths, plus telescoping joints

Completely adjustable after it's hung. For example, if two ends terminate 6½ inches apart, connection can still be made with a telescoping joint

Faster to Install • Above photo of fixed joint shows simplicity of design—symmetrical ends—less bars per phase—fewer connections—outward-facing captive bolts



Totally enclosed for safety —at no price premium. No de-rating necessary. Square D's design eliminates need for ventilation

MORE DESIGN FEATURES

Thinnest cross-section available! Tight spots, pipes and structural members present less problems

Easy transposition of phases, using standard telescoping joint parts, for maintaining balanced voltage on long runs

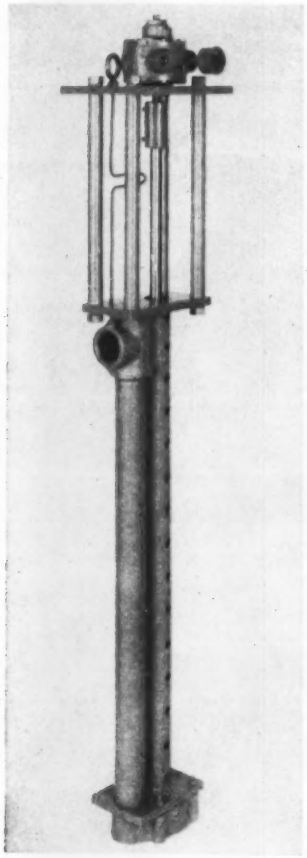
Certified short circuit tests by an independent testing laboratory have proved the superiority of Square D's continuously-supported bus design

***Write** for the complete story*
Address Square D Company, 6060 Rivard Street, Department SA, Detroit 11, Michigan

NOW...EC&M PRODUCTS ARE A PART OF THE SQUARE D LINE

SQUARE D COMPANY

NEW PRODUCTS and equipment

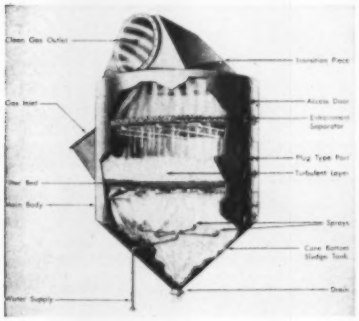


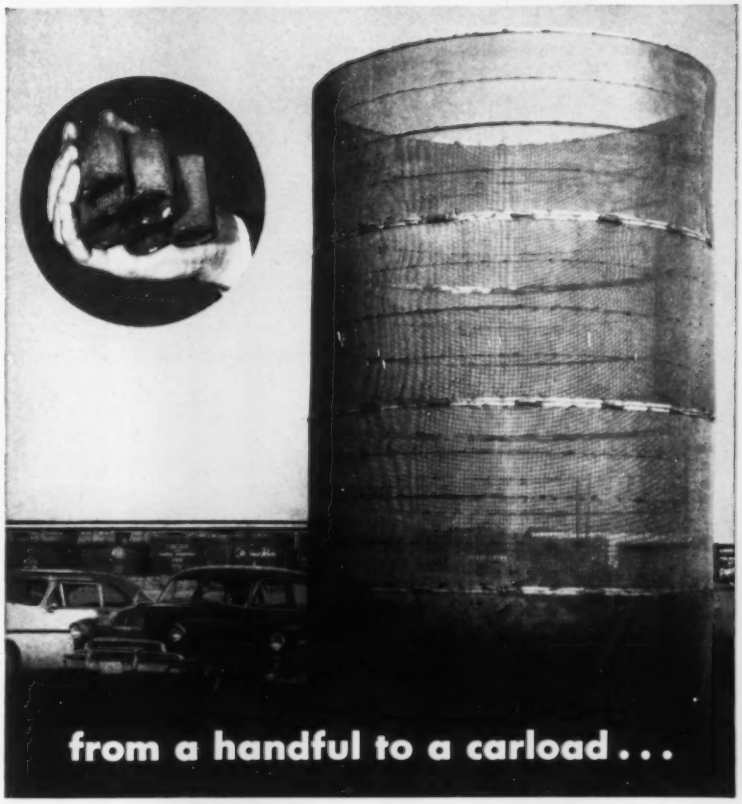
Electric Co., Frankford and Delaware Avenues, Philadelphia 23, Pa. *Phone:* Nebraska 4-0548

Dust Collector

Model IC Hydro-Filter is a wet, scrubber-type dust collector designed for use where more than one unit will be used or wherever a common settling tank or sludge basin is used.

Glass spheres are employed in





Cambridge offers you complete wire cloth fabrication facilities

From giant retaining screens for catalysts or filter media to small strainer assemblies for Diesel engines, fabrication of wire cloth parts to a wide variety of demands is a daily operation at Cambridge. Whatever your needs . . . filter leaves, strainers, sizing screens, retaining screens . . . you can rely on Cambridge for quality and prompt service. We'll work from your prints or draw up prints for your approval.

IF YOU BUY WIRE CLOTH IN BULK, we can give you immediate delivery from stock on large or small orders from the most frequently used types of cloths . . . from the finest to the coarsest mesh.

Accurate mesh count and uniform mesh size are assured by individual loom operation and careful inspection just before shipment.

Let us quote on your next order for wire cloth. Call your Cambridge Field Engineer—he's listed under "Wire Cloth" in your classified telephone book. Or, write direct for FREE 90-PAGE CATALOG and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

The Cambridge Wire Cloth Company

WIRE CLOTH | WOVEN WIRE CONVEYOR BELTS | WIRE CLOTH FABRICATIONS

DEPARTMENT J, CAMBRIDGE 10, MARYLAND

OFFICES IN PRINCIPAL INDUSTRIAL CITIES

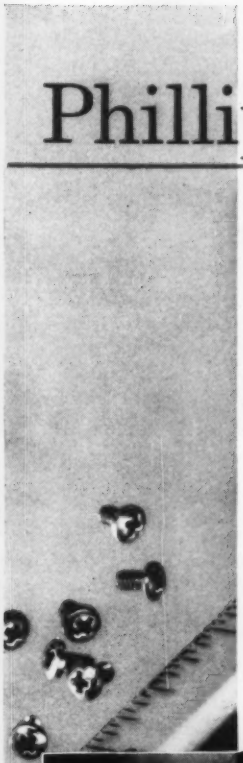
"AS&W wire made

Some typical Phillips head fasteners. Notice the well-defined Phillips punch impression, made with one blow in cold steel.

Typical bank of cold-heading machines. Impression of the Phillips punch is such a severe operation that punches may last from one to several hours.

Phillips fasteners possible,"

says American Screw Company
Willimantic, Conn.



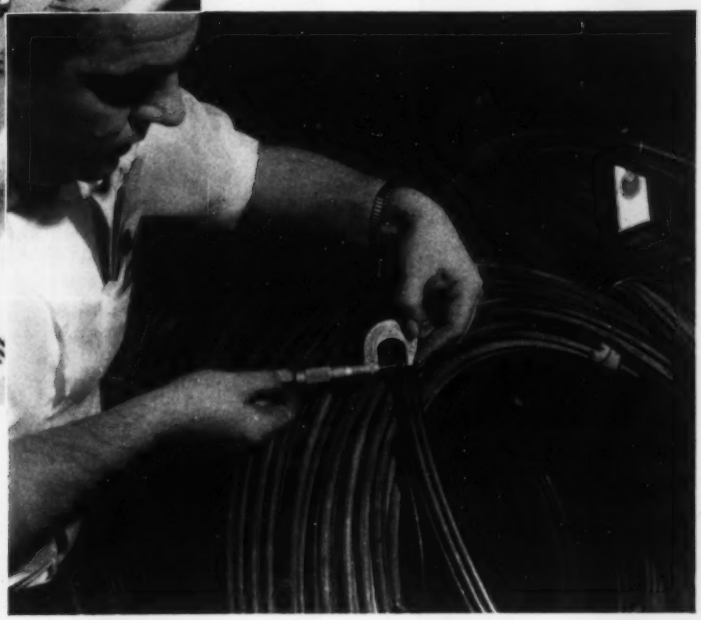
American Screw Company is the largest manufacturer of recessed head fasteners. They produce several million pieces a day, in thousands of different varieties, using many tons of highest quality cold-heading wire.

We're all familiar with the Phillips head fastener. Consider for a moment the production problems involved in making it. In a high-speed, two-blow, cold-heading machine, the wire is cut and cold forged into a blank in the first operation. Then, in the second step, the preformed head is impressed with the Phillips punch. The wire must be hard enough not to buckle; but at the same time, it must be soft enough to flow and fill out the head without splitting—even when the Phillips punch slams into it.

For years, we worked to develop a wire that would withstand the relentless pounding of the Phillips cold-heading machines. We developed a highly engineered method of annealing the wire, then drawing it slightly to work-harden it. It was hard on the outside (no buckling), soft on the inside (easy flowing), clean as a whistle and free from surface imperfections.

We would be tempted to say that this was strictly an American Steel & Wire development . . . but it wasn't. Factually, the development of "Phillips Quality Wire" was a cooperative effort between the men at AS&W and American Screw. It took a long time, but it paid off with beneficial results that have radiated to every industry that has a fastening problem.

There is nothing we'd like better than a chance to cooperate with you to help work out some of *your* wire problems. Just call your AS&W salesman.



Checking a coil of AS&W "Phillips Quality Wire." All wire is bought to finished size. It is shipped coated, ready for heading.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS • TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA., SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS AMERICAN MANUFACTURERS WIRE

USS

AMERFINE —*high-quality fine wire.*
AMERSPRING —*music steel spring wire.*
AMERTEMP —*heavy-duty oil-tempered wire.*
AMER-LED —*leaded steel.*
AMERLOY —*alloy heading wire.*
AMERHEAD —*uniform heading wire.*
AMERSTITCH —*extra-tough metal stitching wire.*
STAINLESS STEEL —*wire and strip.*

UNITED STATES STEEL

FIRST IN SERVICE

TOPS IN QUALITY TAPS . . .

Hanson-Whitney has the long experienced know-how that leads the field in standard and special taps. H-W was first in introducing the "finished after hardening" process, developing the ground-thread tap for industry. Today, H-W has a proven background in the production of taps that assures absolute tops in quality, performance and dollar value.

Example: H-W skilled processing attains a finer concentricity between shank and thread which assures a far greater extent of continued uniformity in tapped holes. And it's performance like this, that enables your production specialists to cut costs over long-range programs.

For further cost economy . . . your schedules can depend on local H-W distributor service . . . providing complete stocks of all standard taps . . . plus H-W field engineering assistance on all special requirements.

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Division of THE WHITNEY CHAIN CO.

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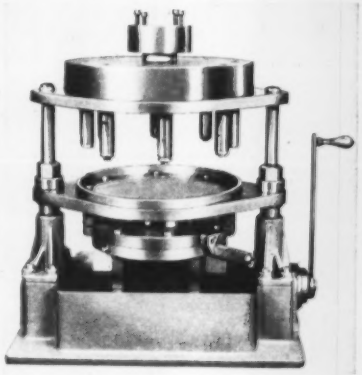
TAPS : THREAD GAGES : HOBS : CENTERING MACHINES : THREAD MILLING MACHINES AND CUTTERS

NEW PRODUCTS and equipment

the separation. No moving parts are present within the collection area. *Write*: National Dust Collector Corp., 700 Machinery Hall, Chicago 6, Ill. *Phone*: State 2-6148

Multiple Spindle Head

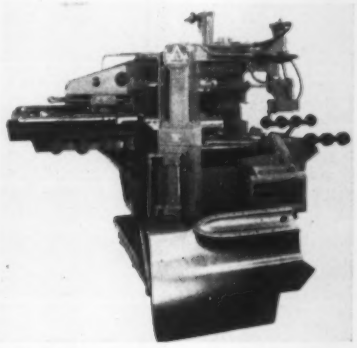
Chains and sprockets are used to transmit the driving power to drills of this multiple spindle drill head from the head of a standard drill press. Changing sprockets will vary the ratio of spindle speeds.



The unit can be used for tapping. Each head is custom-built. *Write*: Nicholson-Berger Co. Inc., 17755 Dora St., Melvindale, Mich.

Hemming Machine

The Hemmer crimps automobile doors, hoods, deck lids, and non-automotive parts which require a hem die and press. Multicontoured doors can be handled.



More than 700 parts an hour can be hemmed. *Write*: Delta Welder Corp., 8525 Livernois, Detroit 4, Mich. *Phone*: Texas 4-8446

24% savings in finishing costs and better forming with Formbrite

FINE DESIGN and a rich luster finish are the main sales features of the quality brassware manufactured by Coronet Brass, Incorporated, New York City.

Coronet's finishing operations, therefore, are of primary importance. Hearing about the outstanding polishing characteristics of Formbrite*, Anaconda's superfine-grain drawing brass, the company placed a trial order. The planter, jardiniere, and "leather-on-brass" waste basket shown above were among the first products made of Formbrite.

After several months of operation, Mr. Maurice Schulman, owner of Coronet Brass, summarized the company's experience with Formbrite as follows:

1. "We estimate that there is a saving of approximately 24% in our initial cutting operation, which represents about three-quarters of the complete finishing-operation for our brassware.

2. "We further estimate that there is an approximately 20% difference in the color-buffing operation—the final step before the brass is lacquered.

3. "We have found that, on a small beading operation performed on one of our items, there is a time saving of about 50% due to the fact that Formbrite does not wrinkle as does regular brass in our automatic beading machine. The operation used to call for extreme vigilance, wasted much time. Now this substantial saving is possible because of Formbrite's springiness."

Formbrite
Superfine-grain drawing brass
an **ANACONDA®** product
made by
The American Brass Company

Find out for yourself. Formbrite is a premium product, yet it doesn't cost a penny more than ordinary drawing brass. Try it and see for yourself how its superfine grain, excellent drawing properties, strength, and scratch resistance can help you cut costs and make a better product. Get a sample or a trial batch. See your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont., Canada.

5274

NEW literature

Write directly to the company for a copy

Instrumentation Recording

Magnetic tapes for use in machine tool control systems, computers, and other instruments are covered in this 8-page bulletin. Charts list the physical and magnetic properties of various precision tapes and summarize the major factors in selecting a tape. Dept. A7-306, Minnesota Mining & Mfg. Co., 900 Bush St., St. Paul 6, Minn.

Pipe and Tube Straightening

Bulletin 55-A, 24 pages, describes straightening problems and methods, model specifications and dimensions, and gives operating instructions for a line of rotary straighteners. Mackintosh-Hemphill Div., E. W. Bliss Co., 901 Bingham St., Pittsburgh 3, Pa.

Steel Tubing

Uses of seamless and electric resistance steel tubing in material handling equipment are described in Booklet IA-6, 12 pages. Ohio Seamless Tube Div., Copperweld Steel Co., Shelby, Ohio.

Centrifugal Castings

Properties and chemical compositions of heat, corrosion, and abrasion resistant alloys; plain carbon and low alloy steels; and nonferrous alloys are tabulated in Bulletin 200, 12 pages. Sandusky Foundry & Machine Co., Sandusky, Ohio.

Seamless Tubing

Tolerances, costs, machinability, and surface finishes of seamless mechanical tubing are discussed in Bulletin TB-340A, 8 pages. Tubular Products Div., Babcock & Wilcox Co., Beaver Falls, Pa.

Presses

Bulletin 757 describes open back, inclined presses from 2 to 85 tons. Sales Service Machine Tool Co., 2363 University Ave., St. Paul, Minn.

Valves and Cylinders

Air and hydraulic units are described in a 4-page bulletin. Rivett Inc., Brighton 35, Boston, Mass.

Cleaning Rooms

Airless blast cleaningrooms are described in a 12-page bulletin, 142-D. An airless blast cleaning machine that can also be used for peening is covered in Bulletin 140-D. Wheelabrator Corp., 1157 S. Byrkit St., Mishawaka, Ind.

Superheat Burners

This 10-page bulletin, S-1054, describes burners which produce high heat release to localized areas of workpieces. Selas Corp. of America, Dresher, Pa.

Automatic Loaders

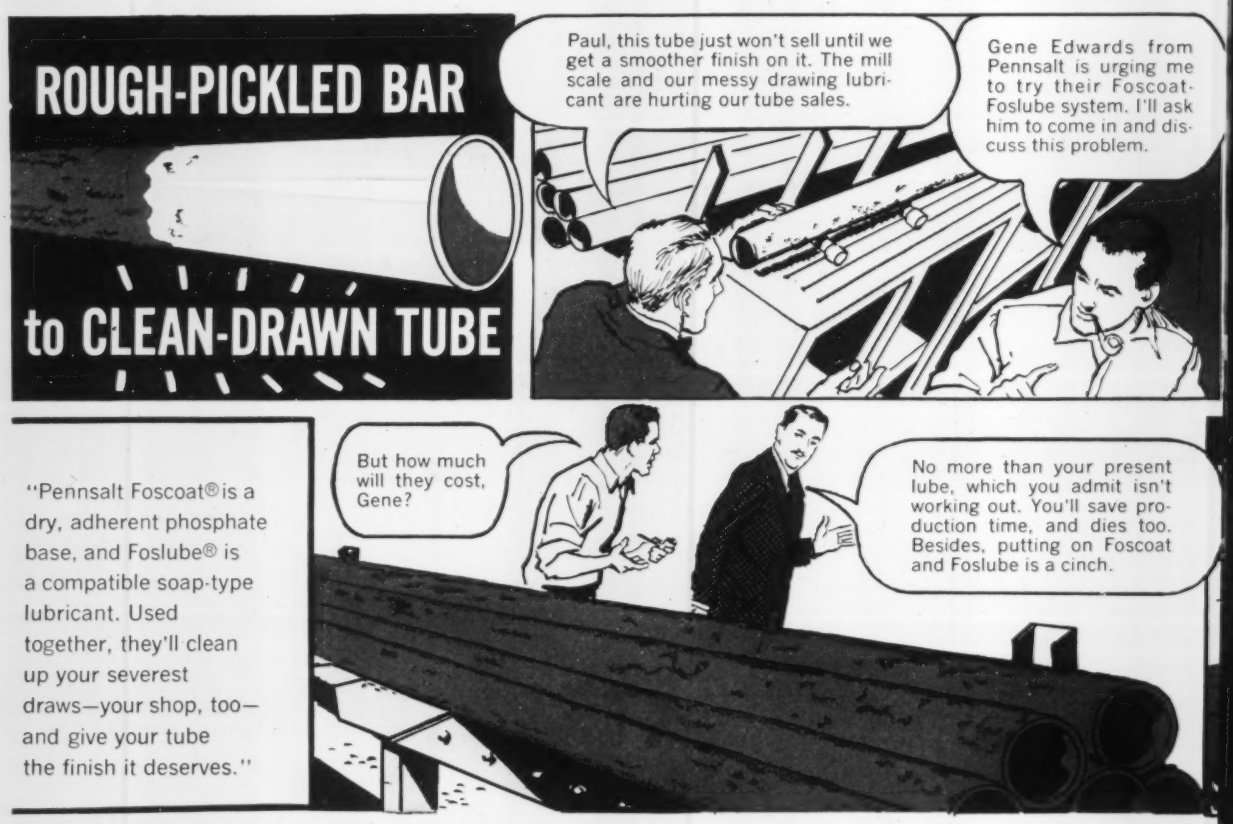
Bulletin 20, 4 pages, describes loaders for heat-treat furnaces, plating lines, and continuous tumbling. Michigan Crane & Conveyor Co., 115 N. McKinstry Ave., Detroit 9, Mich.

Firebrick

A dry press firebrick for industrial heating furnaces is described in Bulletin 801, 6 pages. Refractory Dept., Denver Fire Clay Co., 2301 Blake St., Denver 5, Colo.

Aluminum Machining

This guide gives approximate cutting speeds and feeds of aluminum with standard automatic screw machines. It covers form turning, skiving tools, cutoff drilling, reaming, box tools and hollow mills, external threading, tapping, thread rolling, cross-slide knurling, and turret knurling. A slide rule calculator indicates the pounds per 1000 pieces of hexagonal and round stock (of the generally used aluminum alloys) in sizes from $\frac{1}{8}$ to $1\frac{3}{4}$ in. It also lists mechanical properties of screw


ROUGH-PICKLED BAR
to CLEAN-DRAWN TUBE
Paul, this tube just won't sell until we get a smoother finish on it. The mill scale and our messy drawing lubricant are hurting our tube sales.
Gene Edwards from Pennsalt is urging me to try their Foscoat-Foslube system. I'll ask him to come in and discuss this problem.
But how much will they cost, Gene?
No more than your present lube, which you admit isn't working out. You'll save production time, and dies too. Besides, putting on Foscoat and Foslube is a cinch.
"Pennsalt Foscoat® is a dry, adherent phosphate base, and Foslube® is a compatible soap-type lubricant. Used together, they'll clean up your severest draws—your shop, too—and give your tube the finish it deserves."

NEW LITERATURE . . .

machine stock. A loose-leaf manual presents the fundamentals of machining aluminum. Industrial Advertising Dept., Kaiser Aluminum & Chemical Sales Inc., Box SMS, 919 N. Michigan Ave., Chicago 11, Ill.

Double Pumps

Bulletin G-114, 4 pages, describes a line of double pumps and valve panels for hydraulic oil service. Gerotor May Corp., Owings Mills, Md.

Machining Finishes

This slide chart indicates the right machining operation to get a desired microinch finish. The chart also indicates the equipment to use in measuring finishes. Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich.

Sheet Straighteners

Bulletin 820-T-5, 12 pages, describes a line of straighteners for flattening ferrous and nonferrous coiled strip or sheet. Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.

Barrel Processing

Automatic processing for zinc, nickel, copper, tin, and cadmium plating, cleaning, washing, phosphating, stripping, and similar immersion uses are discussed in this 14-page bulletin. Frederic B. Stevens Inc., 1800 18th St., Detroit 16, Mich.

Plating Preparation

Use of composition No. 90 for the reverse current cleaning of steel before plating is described in this 2-page report. The composition has high conductivity, good smut removal, controlled forming, and long life in solution. Oakite Products Inc., 134E Rector St., New York 6, N. Y.

Cartridge Heating

Bulletin 365, 6 pages, tells how to select and install cartridge heating units. Watlow Electric Mfg. Co., 1376 Ferguson Ave., St. Louis 14, Mo.

Tube Tools

Bulletin 6111, 8 pages, describes tools for flaring, burnishing, double flaring, cutting, bending, and joining of copper and steel tubing. Customer Service Dept., Weatherhead Co., 128 W. Washington Blvd., Ft. Wayne, Ind.

Pneumatic Conveyors

The transfer of granular or powdered bulk materials by pneumatic conveyors is discussed in Bulletin 530, 32 pages. Dracco Corp., P. O. Box 1794, Cleveland 5, Ohio.

Stainless Steel

Uses and properties of Type 430 stainless are presented in a 28-page bulletin. Washington Steel Corp., Washington, Pa.

Electric Motors

This 12-page bulletin describes a line of standard motors. Sterling Electric Motors Inc., 5401 Telegraph Rd., Los Angeles 22, Calif.

Diamond Wheels

This identification code of the American Standards Association is used to specify diamond wheels. Grinding Wheel Institute, 2130 Keith Bldg., Cleveland 15, Ohio.

Stainless Steel Strip

This data sheet covers thin and precision tolerance strip. Included is a tabulation of the properties of hardenable types of the 300 series of stainless steel. Physical data for popular types of the chromium-martensitic, the chromium-ferritic, and the chromium-nickel austenitic groups are included. American Silver Co. Inc., 36-07 Prince St., Flushing 54, N. Y.

Flexible Shafts

Bulletin 5601, 14 pages, describes flexible shafts for remote control,

Paul, for heavy tube drawing like yours you need a reliable, uniform lube system flexible enough to meet all your requirements.

A MONTH LATER...
Gene, you solved our tube-drawing problem! Foscoat and Foslube are giving us "A BETTER START FOR OUR FINISH," as the Pennsalt ads say.

Let your Pennsalt salesman work with you to improve metalworking with chemical know-how . . . in cold working, cleaning, plating, and organic finishing. Learn more about Pennsalt service—mail the coupon.

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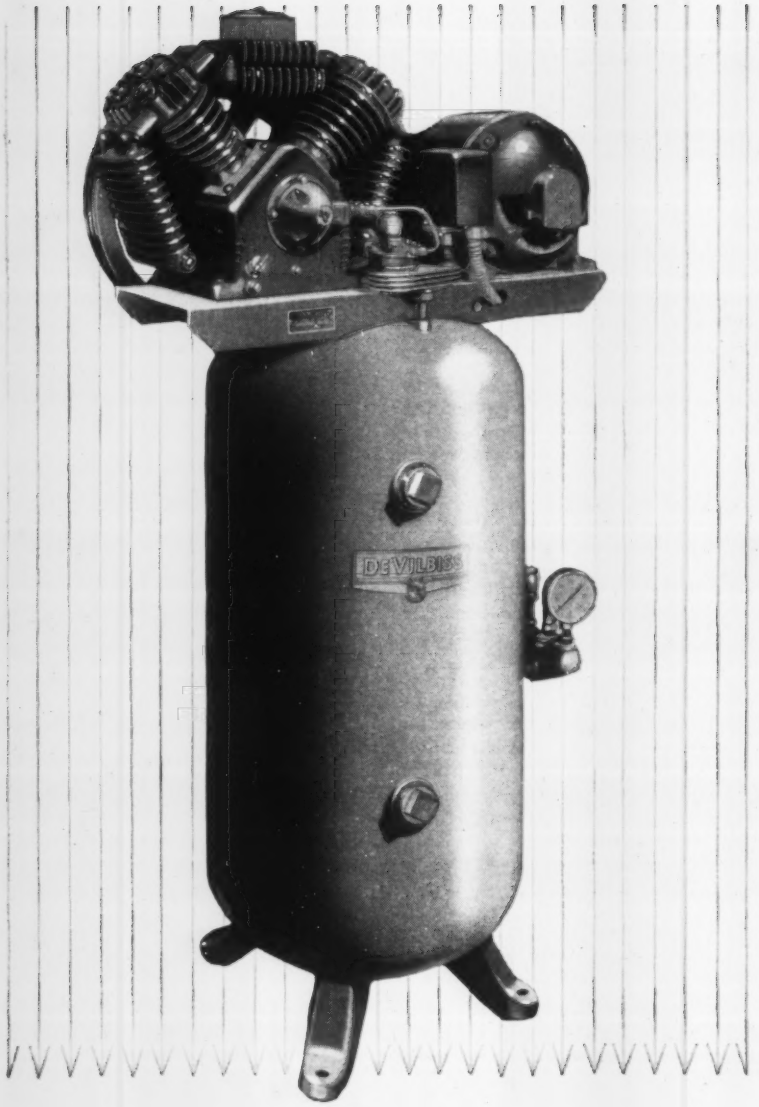

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DeVilbiss compressors are available in single- or two-stage, upright or V-type models; ¼ through 15 hp. For full data, call your nearby DeVilbiss supplier.

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FOR BETTER SERVICE, BUY
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NEW LITERATURE . . .

power drive, and coupling applications. Industrial Div., S. S. White Dental Mfg. Co., 10 E. 40th St., New York 16, N. Y.

Heat Treat Pots

Available sizes, care, and advantages of heat treat pots are covered in this 6-page bulletin. Electro-Alloys Div., American Brake Shoe Co., Taylor Street and Abbe Road, Elyria, Ohio.

Nameplates

Bulletin 177, 4 pages, describes applications of permanent anodized aluminum foil nameplates which can be applied without water, heat, solvent, or tools. W. H. Brady Co., 727 W. Glendale Ave., Milwaukee 9, Wis.

Stainless Welding

This 10-page booklet tells the welder how to make better stainless steel welds. Arcos Corp., Philadelphia 43, Pa.

Heat Exchangers

Shell and tube heat exchangers and cast iron cooling sections are discussed in Bulletin HT-24, 4 pages. Heat Transfer Div., National-U. S. Radiator Corp., 342 Madison Ave., New York 17, N. Y.

Hydraulic Equipment

Valves, cylinders, pump units, presses, and special control systems for the 1000 to 3000 psi pressure range are described in Bulletin BL-757, 12 pages. Benjamin Lassman & Son, Route 8, Glenshaw, Pa.

Beryllium Copper

Properties which make it possible to use this material in a three-part zipper are discussed in Bulletin 39, 4 pages. Beryllium Corp., Reading, Pa.

Grinding Wheels

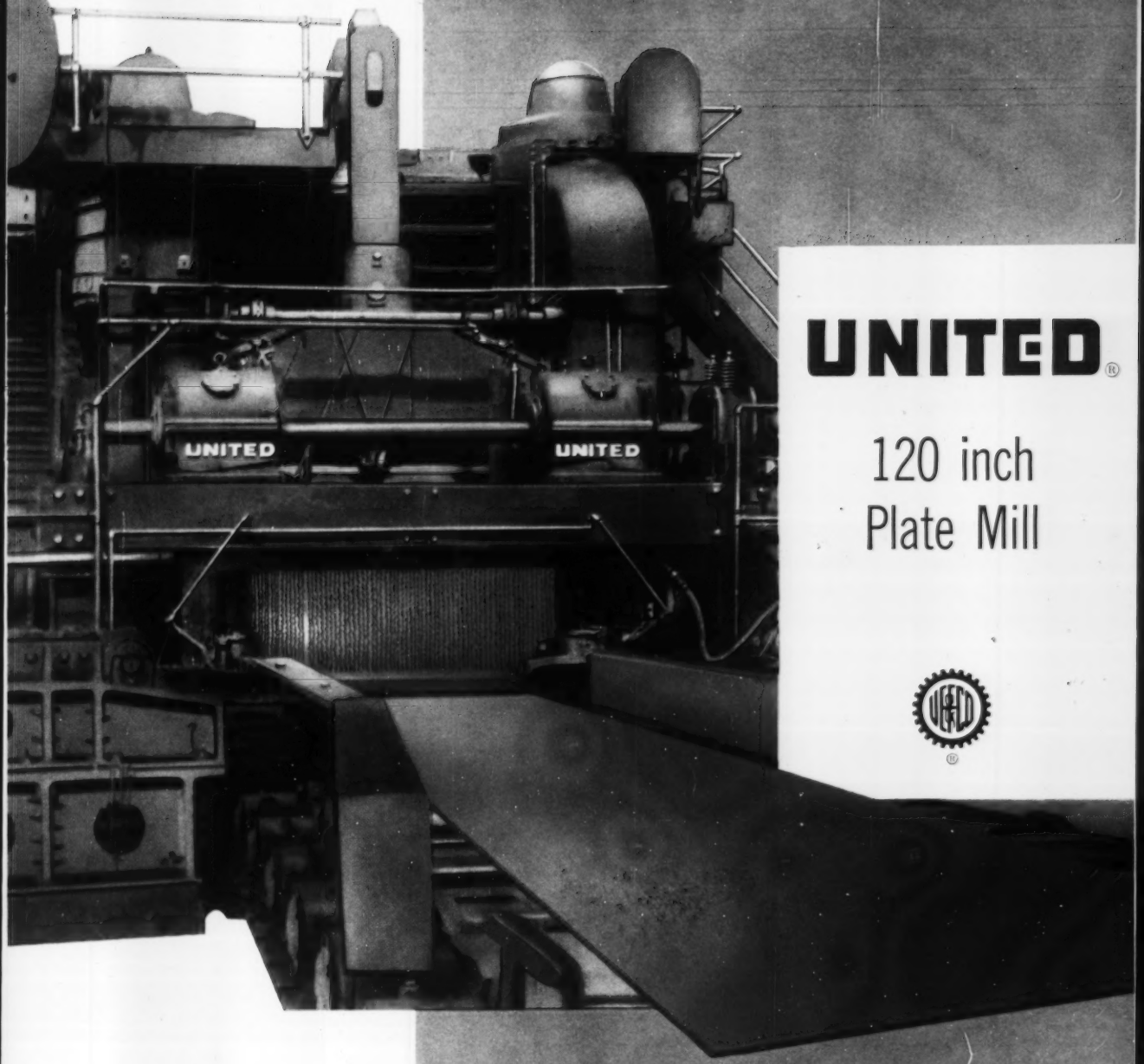
A line of surface wheels is described in this 4-page bulletin. Sales Promotion Dept., Simonds Worden White Co., 1101 Negley Place, Dayton 7, Ohio.

Stainless Steel Products

Fittings, valves, screws, nuts, and other stainless steel items are covered in Catalog 58, 70 pages. Schintzer Alloy Products Co., 325 Pine St., Elizabeth 1, N. J.

Data Processing

Automatic analog and digital control systems for process industries are discussed in this 8-page bulletin. Systems Div., Beckman Instruments Inc., 325 Muller Ave., Anaheim, Calif.



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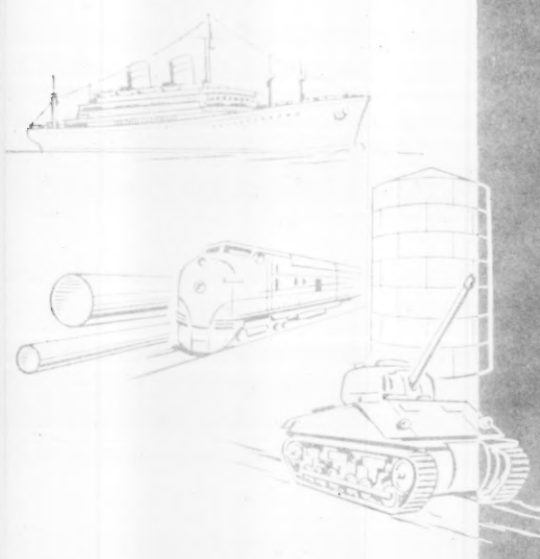
120 inch Plate Mill



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UNITED *can serve you no matter where in the world you are.*

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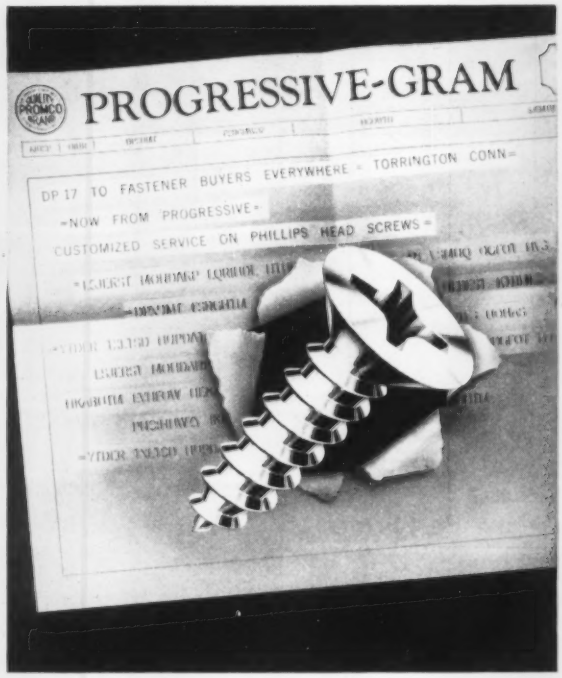
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DP 17 TO FASTENER BUYERS EVERYWHERE - TORRINGTON CONN=
=NOW FROM PROGRESSIVE=
CUSTOMIZED SERVICE ON PHILLIPS HEAD SCREWS=

PROGRESSIVE's *Customized* FASTENERS

Now you can get from PROGRESSIVE, these fasteners with an extra customized touch — fasteners which are custom-made to your order. This means: (1) specifically made for you — not bin stock parts; (2) fast, custom-handling of every order; *plus* (3) the double economy of low initial cost *and* the savings in your assembly operations possible only with high precision, torsion-tested fasteners.

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Market Outlook

STEEL BUYING is moving sideways. It's not showing the pickup that some people expected. They were counting on a splurge from the automotive industry.

Production is moving along in the same fashion as demand—sideways. For a month and a half, ingot output has been in the low 80s. In the week ended Oct. 6, it was 82 per cent of capacity—a repetition of the preceding week's pace. There's considerable variation, though, in operating rates among plants and among districts.

LIVING IT UP—Consumption, though, is outrunning steel buying and production. Consumers are still living to a considerable extent on their inventories. The reduction of inventories is viewed by optimists as a bullish factor for later on—perhaps near the close of this year or early in 1958. When inventories are exhausted, consumers will have to come back into the market for steel.

PICKUP—There are scattered signs (mostly at warehouses) that consumers are starting to buy. The development is verified by Robert G. Welch, executive vice president of the American Steel Warehouse Association, Cleveland. He reports that "shipments from warehouses are showing sparks of life after a prolonged period of reduced sales, and fourth quarter volume will improve."

ENCOURAGED—Armco Steel Corp., Middletown, Ohio, sees a brightening, too. It has made an upward revision in its projected operating rate for the fourth quarter. The company had thought earlier that it would have a fourth quarter rate of 88 per cent. On the basis of orders booked, it's now anticipating at least 90 per cent.

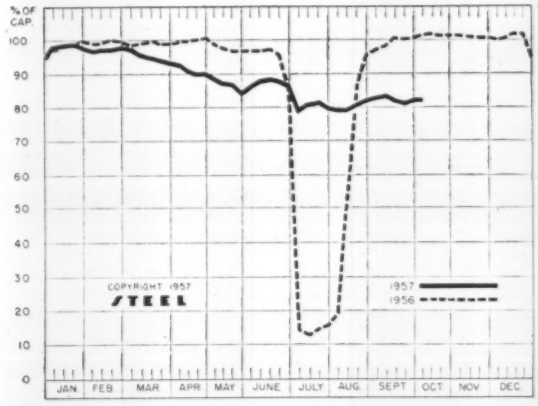
DRIVING—While coasting on their inventories, steel buyers are in the driver's seat as far as service is concerned, but prices are another matter. Steel demand is not so soft that producers would think of cutting standard prices. Production costs work against a cut. Demand is not nearly as low as it was in 1954, and steel prices weren't lowered then. (In 1954, ingot output averaged 71 per cent. In the first three quarters of 1957, it averaged 88 per cent, and the capacity is almost 7.5 per cent larger.)

TOOL STEELS RISE—A current example of the strength and direction of steel prices is seen in tool steels. They are rising 3 to 16 per cent.

The few remaining premium prices, though, are fading away. Phoenix Iron & Steel Co., Phoenixville, Pa., reduced the price of structural shapes to the level of other eastern producers. The reduction: $3.50 a net ton. Structurals were one of the last forms of steel to ease in supply.

SCRAP SLUMPS—Outstanding on the price front is the downhill movement of steel scrap. In the week ended Oct. 2, STEEL's price composite on steelmaking scrap dropped $4.16 a gross ton from the preceding week's level. It put the composite at $42.17 a gross ton, the lowest mark since July, 1955. Prices are being determined almost as much on broker offers turned down by consumers as by purchases. Mills say they are well supplied with scrap for their present rate of operations.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Oct. 6	Change	Same Week 1956	Same Week 1955
Pittsburgh	82	— 1.5*	101.5	101
Chicago	84.5	— 1.5*	100.5	96.5
Mid-Atlantic	86	0	100.5	94.5
Youngstown	75	— 2	101	100
Wheeling	96.5	+ 2.5	104	97.5
Cleveland	86.5	+ 1.5*	107	100.5
Buffalo	100	0	107.5	105
Birmingham	72	— 0.5	95.5	97.5
New England	50	0	75	89
Cincinnati	94.5	+17.5	91.5	89.5
St. Louis	77.5	— 1.5*	100	98.5
Detroit	97	+ 2.5*	101	98
Western	95	+ 1	100	96
National Rate	82	0	101.5	97

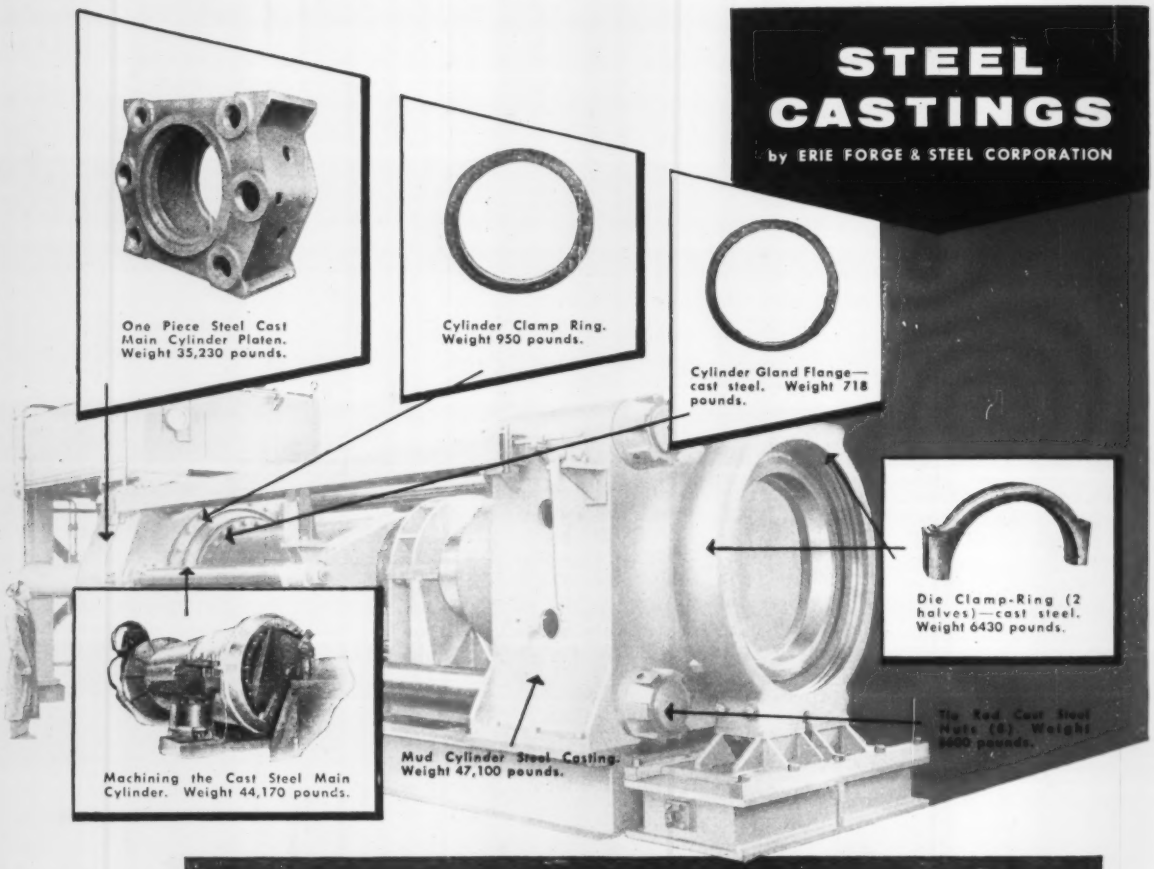
INGOT PRODUCTION‡

	Week Ended Oct. 6	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	131.2†	131.0	129.0	156.0
NET TONS (In thousands)	2,108†	2,105	2,073	2,506

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—Page 113

Technical Outlook—Page 161


STEEL CASTINGS
by ERIE FORGE & STEEL CORPORATION
One Piece Steel Cast Main Cylinder Platen. Weight 35,230 pounds.
Cylinder Clamp Ring. Weight 950 pounds.
Cylinder Gland Flange—cast steel. Weight 718 pounds.
Die Clamp-Ring (2 halves)—cast steel. Weight 6430 pounds.
Machining the Cast Steel Main Cylinder. Weight 44,170 pounds.
Mud Cylinder Steel Casting. Weight 47,100 pounds.

— for Erie Foundry Company's 2000 Ton Hydraulic Carbon Extrusion Press

Some 73 tons of steel castings by Erie Forge & Steel Corporation provide the rugged, brute strength built into this 2000 ton Hydraulic Carbon Extrusion Press by Erie Foundry Company in Erie, Pa. Steel castings are made from raw materials to finished product within our plants. The responsibility for the quality and dependability of these components in the finished machine rests squarely upon our shoulders.

Many years of experience in making specification steel components, both cast and forged, for Erie Foundry Company's heavy hydraulic presses and forging hammers suggest that we can serve you in a similar satisfactory and profitable manner. Steel castings and forgings are produced completely here "Under One Responsibility and One Control". Every step in their production from beginning to end is directed and closely followed by our metallurgical quality control and engineering supervision. You may expect a call from your nearest Erie Forge & Steel Corporation field engineer in the near future.

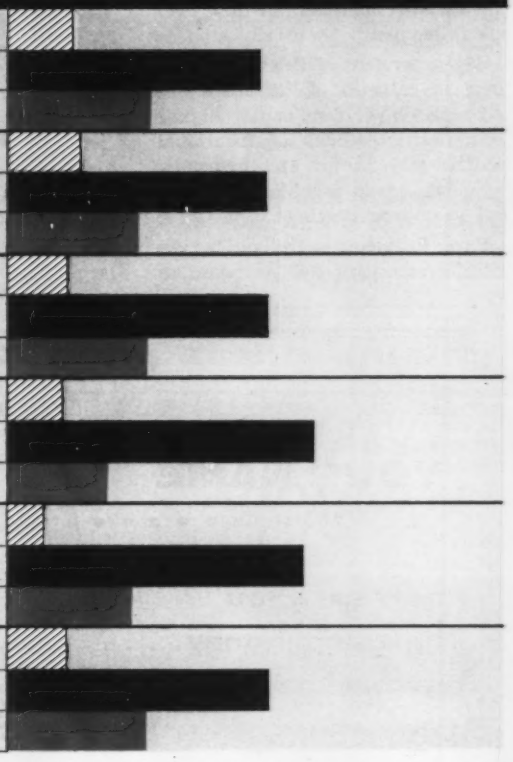
ERIE FORGE & STEEL CORPORATION

ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE

ERIE FORGE & STEEL CORPORATION

COMPONENTS	PRESENT LEVEL COMPARED TO 3 MONTHS AGO		Fourth Quarter Forecast
CASTINGS[1]	8%	HIGHER	14%
	60%	SAME	55%
	32%	LOWER	31%
OTHER FORMED COMPONENTS[2]	7%	HIGHER	16%
	64%	SAME	56%
	29%	LOWER	28%
MACHINED COMPONENTS[3]	5%	HIGHER	13%
	70%	SAME	57%
	25%	LOWER	30%
FASTENERS	2%	HIGHER	12%
	79%	SAME	67%
	19%	LOWER	21%
ELECTRICAL EQUIPMENT AND MOTORS	8%	HIGHER	8%
	73%	SAME	65%
	19%	LOWER	27%
MECHANICAL RUBBER GOODS AND BELTING	2%	HIGHER	13%
	80%	SAME	57%
	18%	LOWER	30%



[1]Die, gray iron, malleable, nonferrous, steel.
[2]Forgings, stampings, springs, wire shapes.
[3]Bearings, couplings, cylinders, gears, screw machine products.

Left column shows percentages of PAs in STEEL's survey whose current inventories are higher, the same, or lower than those of three months ago. Right column figures and bar graphs show how the buyers think their stocks will change three months hence

Few Buyers Will Add to Inventories

CONTINUED stability is forecast for inventories of major industrial components.

Fifty-eight per cent of the respondents to STEEL's quarterly survey expect to keep their stocks at the current level during the next three months. Thirteen per cent of the buyers say fourth quarter inventories will be higher. Twenty-nine per cent think they'll be lower.

Comparison of current inventories with forecasts of the previous survey (see STEEL, July 1, p. 99) shows that buyers' expectations were more than fulfilled. While 65 per cent of the purchasing agents predicted their stocks would be unchanged during the third quarter, 69 per cent now report inventories of the size they held three months ago. One buyer in four reports lower inventories, and 6 per cent say stocks are higher.

In five of the six major groups of components, inventories were stabilized more effectively than had been anticipated. The 79 per cent reporting "same" inventories for fasteners far surpassed the 65 per cent who predicted "same" three months ago. In the other categories — castings, machined components, electrical equipment, and mechanical rubber goods—the discrepancy between report and prediction was from 3 to 6 per cent. Only in the case of other formed components (forgings, stampings, springs, and wire shapes) did the percentage predicting "same" inventories exceed the percentage reporting "same," and here the margin was no more than a point.

30 to 60 Days—Most manufacturers continue to hold 30 to 60 day inventories of the major components. The percentage of re-

spondents who stock castings at the 60 to 90 day level has declined from 21 to 12; the percentage stocking fasteners at that level has fallen from 18 to 12.

Seven per cent of the buyers feel their inventories of fasteners are too high; 5 per cent report higher than desired stocks of fractional electric motors, air and hydraulic cylinders, screw machine products, and gray iron castings.

Few Problems — Deliveries are satisfactory, say 96 per cent of the respondents. Minor difficulties are noted in these areas: Bearings (7 per cent have trouble); electrical equipment, especially relays (5 per cent); springs (5 per cent); and forgings (5 per cent).

Wire . . .

Wire Prices, Pages 243 & 244

In a few instances, the wire mills are scheduling heavier tonnage for October. Generally, these producers are sharing substantially in larger automotive volume. One New England producer has placed an additional open hearth in production.

Deliveries on most finished carbon wire products are prompt. The supply of rods and semifinished steel has been built up ahead of finishing departments' needs. Several integrated producers in the East are not yet back to prevacation ingot operations; others are no higher than they were at that time.

Sales of wire and wire products are slow in the Midwest. Demand has not lived up to expectations. Merchant products showed no improvement in September. Generally, a pickup in ordering occurs that month and continues into December as farmers find time to make repairs. Slight improvement is noted in manufacturers wire. But demand on automotive account has not come through as anticipated. The pickup in this industry is usually 30 to 60 days ahead of the heavy assembly schedules.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 242 & 243

Thin backlogs at most sheet and strip mills are reflected in the fact producers accepted orders for October shipment right up to the end of September. Most makers can give prompt shipments because they have built up substantial stocks of semifinished steel.

The over-all sheet market situation is mixed. There has been a little improvement in cold-rolled sheets and further gains are anticipated. Hot-rolled and galvanized sheets are not doing as well as expected. Galvanized sheets seem to be slowest.

In the East, carbon sheet and strip bookings for October are under expectations. November scheduling is slow. Users are paying little attention to leadtime, placing few forward orders. A mild increase in auto requirements accounts for what gain has been registered so far this fall. Eastern sheet mills are not booked full for October. Some area sellers see little improvement over September's volume.

Pittsburgh suppliers of cold-rolled sheets expect an improvement in sales this month, especially on auto account. The appliance industry is not showing

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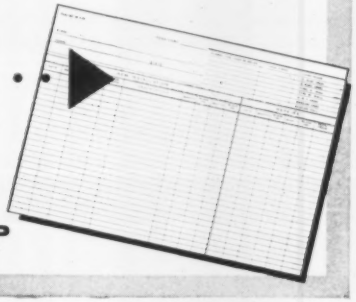

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UNIT-SUSPENDED WALLS AND ARCHES

much interest, though a few makers have raised their October tonnages. Unless there is immediate pickup in auto buying for November and December, October could turn out to be the best month of the quarter. Sheetmakers are badly disappointed in auto business so far this fall.

Absence of forward buying is holding back bookings in New England. October volume there, including auto tonnage, is disappointing. Some cancellations of early automotive orders are reported — including cutbacks by a muffler producer. A heavy stamping shop in the Boston area has closed. High costs tied to its latest labor contract make it difficult for this company to compete pricewise for Detroit auto volume.

Tool Steel . . .

Tool Steel Prices, Page 245

Several tool steel producers have followed the lead of Crucible Steel Co. of America in increasing prices of tool steel, effective Oct. 1.

Shipments of high speed and tool steel (excluding hollow drill steel) in August totaled 7479 net tons, reports the American Iron & Steel Institute. In July 6034 tons were shipped, and 10 354 tons were moved in August, 1956.

Cumulative shipments in the first eight months this year were 69,596 tons, compared with 87,089 tons moved in the like period last year.

Steel Bars . . .

Bar Prices, Page 241

Over-all carbon bar business is slightly heavier. But volume continues disappointing; consumers appear to be ordering only for needs in sight. Orders for October are up a little, but November bookings are small.

The ability of the barmakers to give relatively prompt shipments, including alloys, tends to discourage forward buying. Substantial stocks of billets at mills point to continued prompt deliveries on the standard grades even though buying should pick up suddenly.

Improvement in demand stems almost entirely from quickening automotive requirements. Warehouses are not placing much tonnage with the mills, and mills are reported booking more small lots.

Both carbon and alloy bar buying is light in New England. October mill schedules are not filled. Converters are not placing orders for hot rolled because their inventories are substantial and because demand for cold-finished bars continues slow. All electric ingot capacity of the Northeastern Steel Corp., Bridgeport, Conn., is down. Cold-drawn bar mill operations in the area are no better than 50 to 60 per cent of capacity.

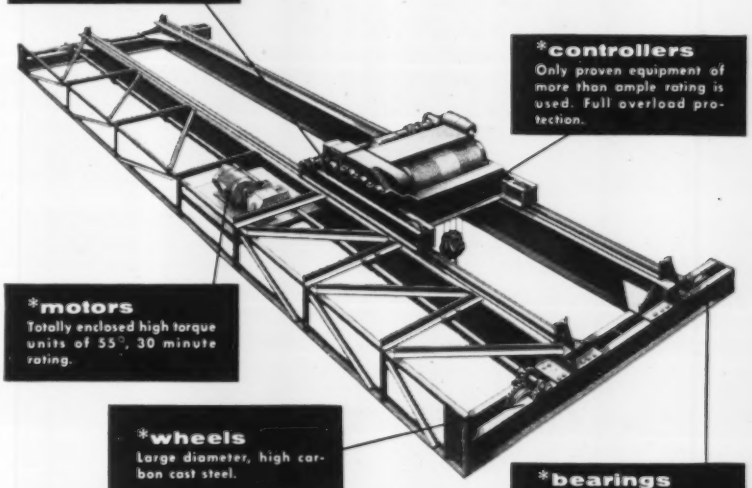
Plates . . .

Plate Prices, Page 241

Fourth quarter carryover on heavy sheared plates is reported to run three to four weeks. Producers are filling November schedules, open tonnage for that period being reduced by the third quarter overflow.

Heavy and wide plates continue on allocation. No material increase in tonnage availability is likely before December. By that

no crane of comparable quality is more CONSERVATIVELY PRICED!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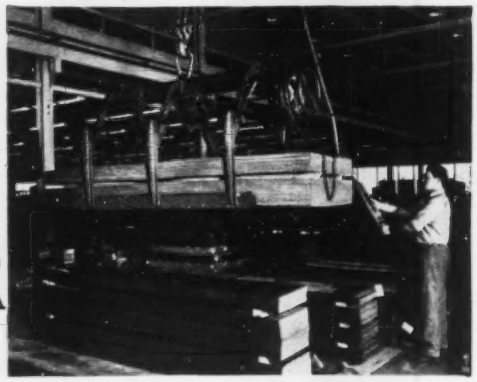

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time, most mills hope to be current with commitments.

Demand for quality grades and boiler plate is active. However, some easing in buying, or at least in demand pressure has been noted. Some shops are less inclined to order far ahead, except against contracts for fabricated work.

Tubular Goods . . .

Tubular Goods Prices, Page 245

The strongest feature of the tubular goods market now is oil country tubing. Producers expect to sell all they can produce in the fourth quarter.

Specialty tubing sales are slow. Pressure tubing demand is only fair, but producers hold backlogs of requirements from utilities. These are sustaining production schedules at a moderate rate.

New orders are tending downward for both pressure and mechanical tubing. A large Pittsburgh supplier of mechanical tubing thinks October will be the slowest month in sales during the fourth quarter. With warehouse inventories depleted, sales should rise in November and December.

The City of Seattle will open bids Oct. 9 for a sizable tonnage of cast iron pipe. Currently, demand is off seasonally.

Warehouse . . .

Warehouse Prices, Page 246

Activity in the warehouse steel market is disappointingly slow in most areas and is not expected to gain materially this month.

But one of the largest distributors in the Pittsburgh district reports its first significant rise in bookings since the first half of the year. A steady advance is taking place in some products which had been moving slowly, including bars and mechanical tubing.

Plates and structural shape sales are continuing strong, although there is less need now for mill buyers to supplement their purchases with tonnages from warehouses. Mill shipments on small lots of all products (ordinarily fill-in-type of volume going to warehouses) is cutting into distributors' sales. Only wide flange beams and heavier sheared plates offer any procurement problem.

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 241

Order backlogs are shrinking at Pacific Northwest rolling mills. No large placements have been made recently, though there has been a substantial volume of small tonnages booked. Pending public work projects in the area indicate heavy awards during this quarter. The largest reinforcing job pending in the district involves 6300 tons for the Washington State Hood Canal floating bridge, bids Oct. 15.

Tin Plate . . .

Tin Plate Prices, Page 243

Tin plate makers are not too concerned about the long term effects of plans by a motor oil producer to use aluminum cans in place of tin cans.

A Pittsburgh tin plate producer said: "While aluminum cans may eventually displace tin plate in some applications, this will not affect the long term growth of tin plate production."

Currently, tin plate sales are declining seasonally.

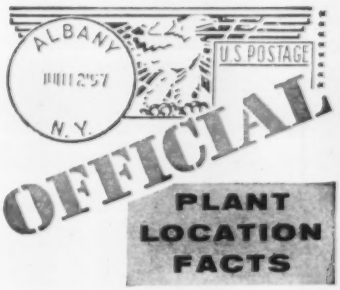
Pig Iron . . .

Pig Iron Prices, Page 246

Mystic Iron Works, Everett, Mass., has increased its pig iron prices $1 a ton for the fourth quarter. They are $67.50 for basic, $68 for No. 2 foundry, and $68.50 for malleable, f.o.b. furnace. The price is based on the previous quarter's costs under contracts with most New England melters.

October shipments are expected to approximate September's. New England foundry backlogs are thin. The melt by textile mill equipment shops and suppliers of castings for the machine tool industry is well under capacity; in most instances it is hardly better than 50 per cent.

In other districts, the over-all call for merchant iron has shown little improvement. The hesitancy which has been evident in general industrial circles also appears to have affected the attitude of iron buyers. Most iron consumers have taken a wait-and-see attitude concerning fourth quarter business. They have been buying iron in limited tonnages to



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Stability: Year after year, on the average, it loses the fewest man hours (per hours worked) due to work stoppages.

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  by skills
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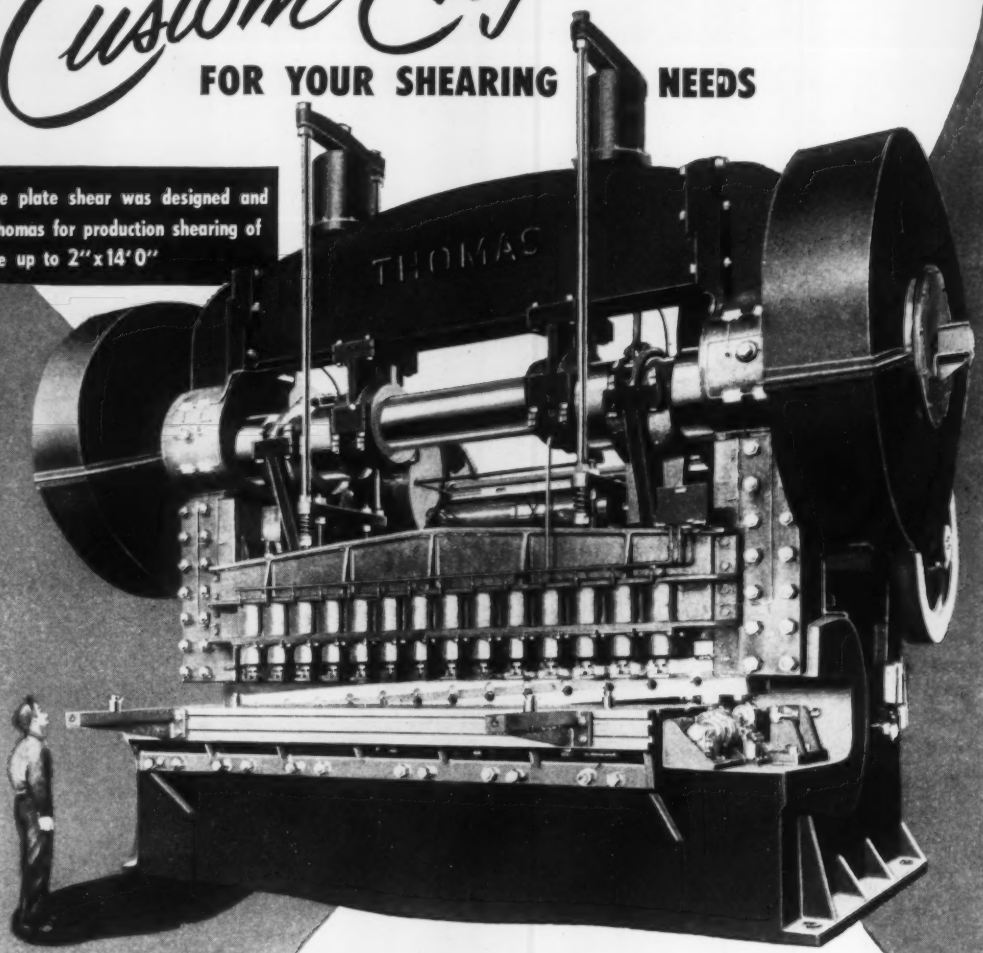

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care for their short term needs but little more.

Structural Shapes . . .

Structural Shape Prices, Page 241

With the mills running four to six weeks behind on wide flange deliveries, carryover tonnage will hold allotments of structurals to recent quotas as least through November. Heavier demand for bridge tonnage continues to contribute to the tight situation in wide flange supply.

Standard structurals are in improved supply, and fabricators are not ordering as heavy as they have in past months. Because shipments of fabricated steel are in excess of bookings, bridges excepted, shops are more competitive, and price margins are thinner. One fabricator in the East is down to four-five months on bridge tonnage deliveries and is booking some tonnage on a shipment basis. Larger shops are extended to mid-1958 and beyond on commitments.

Bridge estimating is noticeably heavier. New York state closes Oct. 10 on 17,000 tons, including an 11,000-ton viaduct in the Bronx, composite girder and I-beams. This opening also includes a 4900-ton suspension bridge. Contractors are also placing 4000 tons for Pennsylvania spans.

There is also an increase in contracts placed, led by 6940 tons for the Inter-Church addition, Riverside Church, New York. It will be fabricated by the Dreier Structural Steel Co. Inc., Long Island City, N. Y.

Heavier tonnage is out in the Chicago and Denver areas. American Bridge Div., U. S. Steel Corp., has booked 4345 tons for railroad grade separations in the Chicago district. Bridges and schools account for the bulk of structural inquiry in New England.

The increase in bridge work stems from delayed federal highway programs which are now going ahead.

A new 14-in light beam (with 4-in. flange, and weighing only 17.2 lb per foot) is being produced and marketed by Jones & Laughlin Steel Corp., Pittsburgh. The beam will extend the range of sections which architects and engineers use in designing apartments, schools, hospitals, shopping centers, parking decks, and industrial and commercial buildings.

Phoenix Iron & Steel Div., Barium Steel Corp., last week reduced its price on structurals $3.50 a ton, now quoting $5.325 per 100 lb, Phoenixville, Pa. It had been quoting $5.50. This reduction eliminates the premium that had been quoted over the Eastern Pennsylvania and Lackawanna, N. Y., mills.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6940 tons, Inter-Church Center, addition to Riverside Church, New York, to the Dreier Structural Steel Co. Inc., Long Island City, N. Y.; Turner Construction Co., New York, is general contractor.

5845 tons, state bridge structures, Project Fish-57-16, Albany and Saratoga counties, New York, to the American Bridge Div., U. S. Steel Corp., Pittsburgh; D. A. Collins Engineering & Construction Co., Mechanicville, N. Y., general contractor.

4345 tons, railroad grade separation structures, Kinzie-Hubbard, Ill., Chicago, to the American Bridge Div., U. S. Steel Corp., Pittsburgh.

2845 tons, subway, Route 112, Section 2, Manhattan, New York, to the Grand Iron Works, Bronx, New York; Cayuga Foundation Corp., New York, general contractor.

1000 tons, highway-railroad grade crossing separations, near Saratoga Springs, N. Y., to the Lehigh Structural Steel Co., Allentown, Pa.; Perini Corp., Framingham, Mass., general contractor.

2580 tons, state bridge structures, Albany county, N. Y., to the Harris Structural Steel Co., New York; L. G. Defelice & Son Inc., North Haven, Conn., general contractor.

1500 tons, boiler supports, Pennsylvania Power & Light Co., Brunners Island, Pa., to the Bethlehem Steel Co., Bethlehem, Pa., through the Combustion Engineering Co., New York.

920 tons, state highway bridge, Nassau County, New York, to the Central Iron Works Inc., the Bronx, New York; Davis Construction Corp. and Tuckahoe Construction Co., New York.

400 tons, four cableway towers, Glenn Canyon project, Kenah, Utah, to a west coast fabricator; Merritt-Chapman & Scott Corp., New York, general contractor.

280 tons, Cantine Ulster County bridge, New York, to Klevens Corp., Yonkers, N. Y.; Shanahan Construction Co., general contractor.

340 tons, storehouse, bakery and cold storage building, Newark, N. J., to the Bethlehem Contracting Co., Bethlehem, Pa.; Brown-Turner Inc., Newark, general contractor.

135 tons, grade separation structure, Route 32, Waterford, Conn., to the Schacht Steel Construction Inc., Bronx, New York; Arute Bros. Inc., New Britain, Conn., is general contractor.

350 tons, parochial school, York, Pa., to the Dauphin Steel & Engineering Co., Harrisburg, Pa.

120 tons, Ulster County bridge, Kingston, N. Y., to the Bethlehem Steel Co., Bethlehem, Pa.; Anthony Costanzi Corp., New York, general contractor.

120 tons, state highway bridge, Lehigh County, Pennsylvania, to the Lehigh Structural Steel Co., Allentown, Pa., through Glasgow Inc.,

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Philadelphia, general contractor.

90 tons, Sand Point School, Seattle, to the United Iron Works, Seattle.

STRUCTURAL STEEL PENDING

11,000 tons, 76-span composite girder and I-beam, 5330-ft viaduct, Bruckner Expressway, Section 1, Contract 2, Bronx, New York; bids Oct. 10, Albany, N. Y.; three sections will take an estimated 25,000 tons.

5500 tons, addition, to the Federal Reserve Bank, Chicago.

4900 tons, superstructure, 2150-ft suspension bridge, Ogdensburg bridge project, Contract 3 St. Lawrence, N. Y.-Grenville, Ont.; bids Oct. 10, Albany, N. Y.

4000 tons, sintering plant, Inland Steel Co., Indiana Harbor, East Chicago, Ind.

3300 tons, three bridges, bids direct, Cook and Kendell counties, Illinois.

3100 tons, office building, Los Angeles; George A. Fuller Co., New York, general contractor.

3000 tons, postal annex building, Denver; bids Oct. 8.

2800 tons, eight-story addition, department store, Hartford, Conn.; Turner Construction Co., New York, general contractor.

2560 tons, highway bridges, Panama City, Fla.

2500 tons, powerplant, Pennsylvania Power & Light Co., Pittsburgh; Stone & Webster Engineering Corp., Boston.

1700 tons, powerplant, Yankee Atomic Energy Corp., Rowe, Mass.; Stone & Webster Engineering Corp., Boston, contractor-engineer; for vapor containers, in addition to 950 tons, previously noted.

1200 tons, state service building, Denver; bids in.

1100 tons, office building, Travelers Insurance Co., Boston; George A. Fuller Co., Boston, general contractor.

240 tons, Montana State underpass, Great Falls, Mont.; general contract to the Sweeten Construction Co., Great Falls.

100 tons, fire damage repairs, McChord Field hangar, Washington State; rebids to the U. S. Engineer, Seattle, Oct. 24.

REINFORCING BARS . . .

REINFORCING BARS PLACED

925 tons, school, Philadelphia, to the American Steel Engineering Co., Philadelphia, through the Bornstein Construction Co., general contractor.

800 tons, office building, Government Employes Insurance Co., Bethesda, Md., to the Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Philadelphia, is general contractor.

570 tons, state highway structures, Lehigh County, Pennsylvania, to Taylor-Davis Co., Philadelphia, through Morrissey & Co., general contractor.

495 tons, highway-railroad grade crossing separations, near Saratoga Springs, N. Y., to the Albany Steel & Iron Co., Albany, N. Y.; Perini Corp., Framingham, Mass., general contractor.

470 tons, state highway structures, Lehigh County, Pennsylvania, to the American Steel Engineering Co., Philadelphia, through Glasgow Inc., general contractor.

480 tons, state highway structures, Route 108, Camden County, New Jersey, to Taylor-Davis Co., Philadelphia.

430 tons, school, 16th Street, Philadelphia, to the Bethlehem Steel Co., Bethlehem, Pa., through McClosky & Co., general contractor.

375 tons, addition, Lankenau Hospital, Philadelphia, to the American Steel Engineering Co., Philadelphia.

220 tons, Clayton Elementary School, Chester, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

200 tons, Washington State, Pierce County, undercrossing, to the Northwest Steel Rolling Mills Inc., Seattle; John E. Alexander, Seattle, general contractor, low at $150,581.

185 tons, power plant addition, Public Service Electric Co., Morristown, N. J., to the Concrete Steel Co., Philadelphia.

150 tons, junior high school, Souderton, Pa., to the United States Steel Supply Div., U. S. Steel Corp., Philadelphia.

150 tons, building, Air Products Inc., Allentown, Pa., to the Bethlehem Steel Co., Bethlehem, Pa.

115 tons, Council Rock High School, Berk County, Pennsylvania, to the American Steel Engineering Co., Philadelphia.

REINFORCING BARS PENDING

555 tons, state highway bridges, Scranton, Pa.; also 1455 tons of fabricated structural steel.

450 tons, highway and bridges, Erie County, Pennsylvania; also 500 tons of mat reinforcing, and 640 tons of structural steel; bids in.

400 tons, addition, Mercer County Hospital, Trenton, N. J.

375 tons, Washington State highway projects, Thurston, Grant, Lewis, and Lincoln counties; bids to Olympia, Wash., Oct. 15.

250 tons, highway bridges, Lackawanna County, Pennsylvania, L.R. 790, Section 1-A; also 520 tons of fabricated structural steel;

240 tons, highway and bridges, Girard-Fairview townships, Erie County, Pennsylvania; also 410 tons of highway mesh, and 625 tons of fabricated structural steel; bids in.

275 tons, highway bridges, Menallen-Franklin townships, Fayette County, Pennsylvania; also, 385 tons of fabricated structural steel.

180 tons, building, U. S. Navy, Wilmington, Del.

175 tons, Idaho State highway projects, Lewis and Nez Perce counties; also unstated tonnage, gates and miscellaneous; bids to Boise, Idaho, Oct. 8.

170 tons, building, M. A. Bruder Co., Philadelphia.

100 tons or more, Oregon State overpass, Multnomah County; general contract to Brkemeier Construction Co., Milwaukee, low at $256,373.

100 tons or more, one phase of the Helena Valley project, Montana; general contract by the Bureau of Reclamation to Cherf Bros. & Sandkay Inc., Ephrata, Wash., low at $947,885.

Unstated, 1500 ft, 54-in. siphon, Rouse River, Oregon, project; Misco West Coast Inc., Seattle, is low to the Bureau of Reclamation at $88,565 for monolithic concrete, and $97,649 for precast concrete.

Unstated, also miscellaneous metal, two concrete spans, Lane County, Oregon; bids to the Bureau of Public Roads, Portland, Oreg., Oct. 9.

PLATES . . .

PLATES PLACED

150 tons, water storage tank, Empire, Oreg., to the Pittsburgh-Des Moines Steel Co., Seattle.

40 tons, storage tank, Montesano, Wash., to the Reliable Welding Works, Olympia, Wash.

PLATES PENDING

500 tons, Cougar Dam project, Oregon; Henry H. Miller Inc., Rossburg, Oreg., low at $886,805 to the U. S. Engineer, Portland, Oreg.; involves 2830 ft of 72 to 8-in. C.M. pipe and 300 ft of 96-in. structural plate pipe.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Canadian Pacific, 117 diesel units; General Motors Diesel Div., 31 switchers (1200 hp capacity) and 23 road switchers (1750 hp capacity); Montreal Locomotive Works, 52 road switchers (1800 hp capacity); and 11 yard switchers (660 hp capacity).

RAILROAD CARS PLACED

Rock Island, 100 fifty-ton flats, half riveted frames and half cast steel frames, to own shops.

Missouri Pacific, 50 seventy-ton covered hoppers, to General American Transportation Corp., Chicago.

Chicago & Eastern Illinois, ten depressed-center, 125-ton capacity, flats, to company shops.

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Deformed Bars (⅝" Dia. incl. all extras)	$6.63	$6.86	$6.61	$6.29
Merchant Bars (¼" Round incl. all extras)...	7.62	7.85	7.48	7.22
Bands (1"x⅛"x20' incl. all extras)	7.76	7.98	7.65	7.38
Angles (2"x2"x¼" incl. all extras)	6.57	6.75	6.99	6.69
Beams & Channels (base)	6.82	7.00	7.24	6.94
Furring Channels (C.R. ¾", per 1000')	26.62	27.77	....	....
Barbed Wire (per 82 lb. net reel)	6.95	7.40	7.75	7.80
Nails (bright, common, 20d and heavier)	8.38	8.58	9.07	8.99
Larssen Sheet Piling (section II, new, incl. size extra)	7.80	8.10	8.10	7.80
Wire, Manufacturer's bright, low C, (11½ga.)	7.38	7.52	8.52	8.52
Wire, galvanized, low C, (11½ ga.)	8.01	8.15	9.42	9.42
Wire, Merchant quality, bl. ann., (10 ga.)...	7.60	7.75	8.78	8.78
Rope Wire (.045", 247,000 PSI, incl. extras)..	13.60	13.75	13.00	13.00
Wire, fine and weaving, low C, (20 ga.)	10.66	10.80	10.17	12.17
Tie Wire, autom. baler (14½ ASWG, 97 lbs. net)	9.58	9.73	9.64	9.54
Merchant Pipe (½" galv. T & C, per 100')...	8.48	8.83	....	....
Casing (5½", 15.5 J55, T & C, per 100')	194.00	199.00	....	....
Tubing (2⅞", 6.4 J55, EUE, per 100')	103.00	104.00	....	....
Forged R Turn. Bars, C-1035 (from 10" dl.).	14.00	14.23	14.00	13.74

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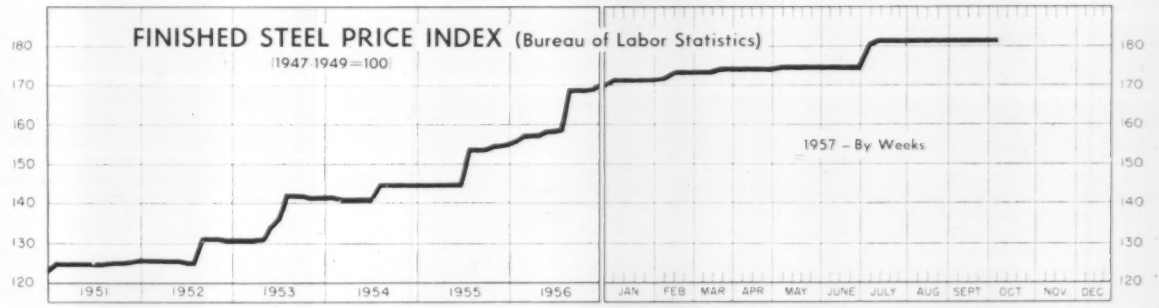
Price Indexes and Composites



Oct. 1, 1957	Week Ago	Month Ago	Sept. Avg.	Year Ago
181.7	181.5	181.5	181.5	168.6

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Oct. 1

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.600	Bars, Reinforcing	6.210
Rails, Light, 40 lb	7.067	Bars, C.F., Carbon	10.360
Tie Plates	6.600	Bars, C.F., Alloy	13.875
Axles, Railway	9.825	Bars, C.F., Stainless, 302 (lb)	0.553
Wheels, Freight Car, 33 in. (per wheel)	60.000	Sheets, H.R., Carbon	6.192
Plates, Carbon	6.150	Sheets, C.R., Carbon	7.089
Structural Shapes	5.942	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.525	Sheets, C.R., Stainless, 302 (lb)	0.688
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.640	Sheets, Electrical	12.025
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75 Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.404	Strip, C.R., Carbon	9.243
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.899	Strip, C.R., Stainless, 430 (lb)	0.493
Bars, H.R., Alloy	10.525	Strip, H.R., Carbon	6.245
Bars, H.R., Stainless, 303 (lb)	0.525	Pipe, Black, Buttweld (100 ft)	19.814
Bars, H.R., Carbon	6.425	Pipe, Galv., Buttweld (100 ft)	23.264
		Pipe, Line (100 ft)	199.023
		Casing, Oil Well, Carbon (100 ft)	194.499
		Casing, Oil Well, Alloy (100 ft)	304.610
		Tubes, Boiler (100 ft)	49.130
		Tubing, Mechanical, Carbon (100 ft)	24.953
		Tubing, Mechanical, Stainless, 304 (100 ft)	205.608
		Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
		Black Plate, Canmaking Quality (95 lb base box)	7.583
		Wire, Drawn, Carbon	10.225
		Wire, Drawn, Stainless, 430 (lb)	0.653
		Bale Ties (bundles)	7.967
		Nails, Wire, 8d Common	9.828
		Wire, Barbed (80-rod spool)	8.719
		Woven Wire Fence (20-rod roll)	21.737

STEEL's FINISHED STEEL PRICE INDEX*

	Oct. 2 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	239.15	239.15	239.15	225.71	181.40
Index in cents per lb	6.479	6.479	6.479	6.114	4.914

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$146.03	$146.19	$146.19	$137.75	$111.66
No. 2 Fdry Pig Iron, GT	66.49	66.49	66.49	62.63	55.04
Basic Pig Iron, GT	65.99	65.99	65.99	62.18	54.66
Malleable Pig Iron, GT	67.27	67.27	67.27	63.41	55.77
Steelmaking Scrap, GT	42.17	46.33	51.83	57.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point

FINISHED STEEL

	Oct. 2 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.425	5.425	5.425	5.075	3.95
Bars, H.R., Chicago	5.425	5.425	5.425	5.075	3.95
Bars, H.R., deld., Philadelphia	5.725	5.725	5.725	4.93	4.502
Bars, C.F., Pittsburgh	7.30*	7.30*	7.30*	6.85*	4.925
Shapes, Std., Pittsburgh	5.275	5.275	5.275	5.00	3.85
Shapes, Std., Chicago	5.275	5.275	5.275	5.00	3.85
Shapes, deld., Philadelphia	5.545	5.545	5.545	5.00	4.13
Plates, Pittsburgh	5.10	5.10	5.10	4.85	3.90
Plates, Chicago	5.10	5.10	5.10	4.85	3.90
Plates, Coatesville, Pa.	5.50	5.50	5.50	5.25	4.35
Plates, Sparrows Point, Md.	5.10	5.10	5.10	4.85	3.90
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.35
Sheets, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.775
Sheets, H.R., Chicago	4.925	4.925	4.925	4.675	3.775
Sheets, C.R., Pittsburgh	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Chicago	6.05	6.05	6.05	5.75	4.575
Sheets, C.R., Detroit	6.05-6.15	6.05-6.15	6.05-6.15	5.75-5.85	4.775
Sheets, Galv., Pittsburgh	6.60	6.60	6.60	6.30	5.075
Strip, H.R., Pittsburgh	4.925	4.925	4.925	4.675	3.75-4.00
Strip, H.R., Chicago	4.925	4.925	4.925	4.675	3.725
Strip, C.R., Pittsburgh	7.15	7.15	7.15	6.85	5.10-5.80
Strip, C.R., Chicago	7.15	7.15	7.15	6.85	5.35
Strip, C.R., Detroit	7.25	7.25	7.25	6.95	5.30-6.05
Wire, Basic, Pittsburgh	7.65	7.65	7.65	7.20	5.10-5.225
Nails, Wire, Pittsburgh	8.95	8.95	8.95	8.35	5.90-6.35
Tin plate (1.50 lb) box, Pitts.	$10.30	$10.30	$10.30	$9.85	$8.95

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$96.00	$96.00	$96.00	$91.50	$70.50
Wire rods, 7/32-5/8" Pitts.	6.15	6.15	6.15	5.80	4.325

PIG IRON, Gross Ton

	Oct. 2 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$67.00	$67.00	$67.00	$63.50	$55.50
Basic, Valley	66.00	66.00	66.00	62.50	54.50
Basic, deld., Phila.	70.01	70.01	70.01	66.26	59.25
No. 2 Fdry, NevilleIsland, Pa.	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	63.00	55.00
No. 2 Fdry, deld., Phila.	70.51	70.51	70.51	66.76	59.75
No. 2 Fdry, Birm.	62.50	62.50	62.50	59.00	51.38
No. 2 Fdry (Birm.) deld. Cin.	70.20	70.20	70.20	66.70	58.93
Malleable, Valley	66.50	66.50	66.50	63.00	55.00
Malleable, Chicago	66.50	66.50	66.50	63.00	55.00
Ferromanganese, Duquesne	245.00†	245.00†	255.00†	215.00†	228.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$42.50	$48.50	$53.50	$56.50	$44.00
No. 1 Heavy Melt, E. Pa.	41.00	43.00	51.00	56.50	41.50
No. 1 Heavy Melt, Chicago	43.00	47.50	51.00	58.00	42.50
No. 1 Heavy Melt, Valley	40.50	43.50	54.50	64.50	44.00
No. 1 Heavy Melt, Cleve.	38.50	39.50	51.50	63.00	43.00
No. 1 Heavy Melt, Buffalo	41.50	47.50	49.50	57.50	43.00
Rails, Rerolling, Chicago	59.50	63.50	67.50	83.00	52.50
No. 1 Cast, Chicago	40.50	41.50	44.50	51.50	50.00

COKE, Net Ton

Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.50	$14.75
Beehive, Fdry., Connlsvl.	18.25	18.25	18.25	17.50	17.00

JOHN L. COLLYER

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STEEL
The Metalworking Weekly

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Steel Prices

Mill prices as reported to STEEL, Oct. 2, cents per pound except as otherwise noted. *Changes shown in italics*
Code numbers following mill points indicate producing company. Key to producers, page 242; to footnotes page 244.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ..... $73.50

INGOTS, Alloy (NT)
Detroit S41 ..... $77.00
Farrell,Pa. S3 ..... 77.00
Lowellville,O. S3 ..... 77.00
Midland,Pa. C18 ..... 77.00
Munhall,Pa. U5 ..... 77.00
Sharon,Pa. S3 ..... 77.00

BILLETS, BLOOMS & SLABS
Carbon, Rerolling (NT)
Bessemer,Pa. U5 ..... $77.50
Bridgeport,Conn. N19 .. 80.50
Buffalo R2 ..... 77.50
Clairton,Pa. U5 ..... 77.50
Ensley,Ala. T2 ..... 77.50
Fairfield,Ala. T2 ..... 77.50
Fontana,Calif. K1 ..... 88.00
Gary,Ind. U5 ..... 77.50
Johnstown,Pa. B2 ..... 77.50
Lackawanna,N.Y. B2 .. 77.50
Munhall,Pa. U5 ..... 77.50
S.Chicago,Ill. R2, U5 .. 77.50
S.Duquesne,Pa. U5 ..... 77.50
Sterling,Ill. N15 ..... 77.50
Youngstown R2 ..... 77.50

Carbon, Forging (NT)
Bessemer,Pa. U5 ..... $96.00
Bridgeport,Conn. N19 .. 101.00
Buffalo R2 ..... 96.00
Canton,O. R2 ..... 98.50
Clairton,Pa. U5 ..... 96.00
Conshohocken,Pa. A3 .. 101.00
Ensley,Ala. T2 ..... 96.00
Fairfield,Ala. T2 ..... 96.00
Fontana,Calif. K1 ..... 105.50
Gary,Ind. U5 ..... 96.00
Geneva,Utah C11 ..... 96.00
Houston S5 ..... 101.00
Johnstown,Pa. B2 ..... 96.00
Lackawanna,N.Y. B2 .. 96.00
LosAngeles B3 ..... 105.50
Midland,Pa. C18 ..... 96.00
Munhall,Pa. U5 ..... 96.00
Seattle B3 ..... 109.50
Sharon,Pa. S3 ..... 96.00
S.Chicago R2,U5,W14 .. 96.00
S.Duquesne,Pa. U5 .... 96.00
S.SanFrancisco B3 .. 105.50
Warren,O. C17 ..... 96.00

Alloy, Forging (NT)
Bethlehem,Pa. B2 .. $114.00
Bridgeport,Conn. N19 .. 114.00
Buffalo R2 ..... 114.00
Canton,O. R2, T7 .... 114.00
Conshohocken,Pa. A3 .. 121.00
Detroit S41 ..... 114.00
Economy,Pa. B14 .... 114.00
Farrell,Pa. S3 ..... 114.00
Fontana,Calif. K1 .... 135.00
Gary,Ind. U5 ..... 114.00
Houston S5 ..... 119.00
Ind.Harbor,Ind. Y1 .. 114.00
Johnstown,Pa. B2 .... 114.00
Lackawanna,N.Y. B2 .. 114.00
LosAngeles B3 ..... 134.00
Lowellville,O. S3 ..... 114.00
Massillon, O. R2 .... 114.00
Midland,Pa. C18 .... 114.00
Munhall,Pa. U5 ..... 114.00
Sharon,Pa. S3 ..... 114.00
S.Chicago R2,U5,W14 .. 114.00
S.Duquesne,Pa. U5 .. 114.00
Struthers,O. Y1 ..... 114.00
Warren,O. C17 ..... 114.00

ROUNDS, SEAMLESS TUBE (NT)
Bridgeport,Conn. N19 $122.50
Buffalo R2 ..... 117.50
Canton,O. R2 ..... 120.00
Cleveland,O. R2 ..... 117.50
Gary, Ind. U5 ..... 117.50
S.Chicago,Ill. R2, W14 117.50
S.Duquesne,Pa. U5 .. 117.50
Warren,O. C17 ..... 117.50

SKELP
Aliquippa,Pa. J5 ..... 5.075
Munhall,Pa. U5 ..... 4.875
Warren,O. R2 ..... 4.875
Youngstown R2, U5 .. 4.875

WIRE RODS
AlabamaCity,Ala. R2 .. 6.15
Aliquippa,Pa. J5 ..... 6.15
Alton,Ill. L1 ..... 6.35
Buffalo W12 ..... 6.15
Cleveland A7 ..... 6.15
Donora,Pa. A7 ..... 6.15
Fairfield,Ala. T2 ..... 6.15
Houston S5 ..... 6.40
IndianaHarbor,Ind. Y1 .. 6.15
Johnstown,Pa. B2 ..... 6.15
Joliet,Ill. A7 ..... 6.15
KansasCity,Mo. S5 .... 6.40
Kokomo,Ind. C16 ..... 6.25
LosAngeles B3 ..... 6.95
Minnequa,Colo. C10 .... 6.40
Monessen,Pa. P17 ..... 6.15
N.Tonawanda,N.Y. B11 .. 6.15
Pittsburg,Calif. C11 .... 6.95
Portsmouth,O. P12 .... 6.15
Roebling,N.J. R5 ..... 6.25
S.Chicago,Ill. R2 ..... 6.15
SparrowsPoint,Md. B2 .. 6.25
Sterling,Ill. (1) N15 .... 6.15
Sterling,Ill. N15 ..... 6.25
Struthers,O. Y1 ..... 6.15
Worcester,Mass. A7 .... 6.45

STRUCTURALS

Carbon Steel Std. Shapes
Ala.City,Ala. R2 ..... 5.275
Atlanta A11 ..... 5.475
Aliquippa,Pa. J5 ..... 5.275
Bessemer,Ala. T2 ..... 5.275
Bethlehem,Pa. B2 ..... 5.325
Birmingham C15 ..... 5.275
Clairton,Pa. U5 ..... 5.275
Fairfield,Ala. T2 ..... 5.275
Fontana,Calif. K1 ..... 6.075
Gary,Ind. U5 ..... 5.275
Geneva,Utah C11 ..... 5.275
Houston S5 ..... 5.375
Ind.Harbor,Ind. I-2 ..... 5.275
Johnstown,Pa. B2 ..... 5.325
Joliet,Ill. P22 ..... 5.275
KansasCity,Mo. S5 ..... 5.375
Lackawanna,N.Y. B2 .. 5.325
LosAngeles B3 ..... 5.975
Minnequa,Colo. C10 .... 5.575
Munhall,Pa. U5 ..... 5.275
Niles,Calif. P1 ..... 5.925
Phoenixville,Pa. P4 ..... 5.325
Portland,Oreg. O4 .... 6.025
Seattle B3 ..... 6.025
S.Chicago,Ill. U5, W14 .. 5.275
S.SanFrancisco B3 .... 5.925
Sterling,Ill. N15 ..... 5.275
Torrance,Calif. C11 .... 5.975
Weirton,W.Va. W6 .... 5.275

Wide Flange
Bethlehem,Pa. B2 ..... 5.325
Clairton,Pa. U5 ..... 5.275
Fontana,Calif. K1 .... 6.225
IndianaHarbor,Ind. I-2 .. 5.525
Lackawanna,N.Y. B2 .. 5.325
Munhall,Pa. U5 ..... 5.275
Phoenixville,Pa. P4 .... 5.50
S.Chicago,Ill. U5 ..... 5.275

Alloy Std. Shapes
Aliquippa,Pa. J5 ..... 6.55
Clairton,Pa. U5 ..... 6.55
Gary,Ind. U5 ..... 6.55
Houston S5 ..... 6.65
KansasCity,Mo. S5 .... 6.65
Munhall,Pa. U5 ..... 6.55
S.Chicago,Ill. U5 ..... 6.55

H.S., L.A. Std. Shapes
Aliquippa,Pa. J5 ..... 7.75
Bessemer,Ala. T2 ..... 7.75
Bethlehem,Pa. B2 ..... 7.80
Clairton,Pa. U5 ..... 7.75
Fairfield,Ala. T2 ..... 7.75
Fontana,Calif. K1 ..... 8.55
Gary,Ind. U5 ..... 7.75
Geneva,Utah C11 ..... 7.75
Houston S5 ..... 7.85
Ind.Harbor,Ind. I-2, Y1 7.75
Johnstown,Pa. B2 ..... 7.80
KansasCity,Mo. S5 .... 7.85
Lackawanna,N.Y. B2 .. 7.80
LosAngeles B3 ..... 8.45
Munhall,Pa. U5 ..... 7.75
Seattle B3 ..... 8.50
S.Chicago,Ill. U5, W14 .. 7.75
S.SanFrancisco B3 .... 8.40
Struthers,O. Y1 ..... 7.75

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ..... 7.80
Lackawanna,N.Y. B2 .. 7.80
Munhall,Pa. U5 ..... 7.75
S.Chicago,Ill. U5 ..... 7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ..... 5.325
Lackawanna,N.Y. B2 .. 5.325
Munhall,Pa. U5 ..... 5.275
S.Chicago,Ill. U5 ..... 5.275

STEEL SHEET PILING
Lackawanna,N.Y. B2 .. 6.225
Munhall,Pa. U5 ..... 6.225
S.Chicago,Ill. U5 ..... 6.225

PLATES

PLATES, Carbon Steel
Ala.City,Ala. R2 ..... 5.10
Aliquippa,Pa. J5 ..... 5.10
Ashland Ky. (15) A10 .. 5.10
Bessemer,Ala. T2 ..... 5.10
Clairton,Pa. U5 ..... 5.10
Claymont,Del. C22 ..... 5.70
Cleveland J5, R2 ..... 5.20
Coatesville,Pa. L7 ..... 5.50
Conshohocken,Pa. A3 .. 5.20
Ecorse,Mich. G5 ..... 5.20
Fairfield,Ala. T2 ..... 5.10
Fontana,Calif.(30) K1 .. 5.90
Gary,Ind. U5 ..... 5.10
Geneva,Utah C11 ..... 5.10
GraniteCity,Ill. G4 .... 5.30
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 5.20
Ind.Harbor,Ind. I-2, Y1 .. 5.10
Johnstown,Pa. B2 ..... 5.10
Lackawanna,N.Y. B2 .. 5.10
LoneStar,Tex. L6 ..... 5.45
Mansfield,O. E6 ..... 5.10
Minnequa,Colo. C10 .... 5.95
Munhall,Pa. U5 ..... 5.10
Newport,Ky. A2 ..... 5.10
Pittsburgh J5 ..... 5.10
Riverdale,Ill. A1 ..... 5.10
Seattle B3 ..... 6.00
Sharon,Pa. S3 ..... 5.10
S.Chicago,Ill. U5, W14 .. 5.10
SparrowsPoint,Md. B2 .. 5.10
Sterling,Ill. N15 ..... 5.10
Steubenville,O. W10 ..... 5.10
Warren, O. R2 ..... 5.10
Youngstown R2, U5, Y1 .. 5.10

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ..... 7.35
Fontana,Calif. K1 ..... 7.55
Geneva,Utah C11 ..... 6.75
Johnstown,Pa. B2 ..... 7.00
SparrowsPoint,Md. B2 .. 6.75

PLATES, Wrought Iron
Economy,Pa. B14 ..... 13.15

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ..... 7.625
Bessemer,Ala. T2 ..... 7.625
Clairton,Pa. U5 ..... 7.625
Claymont,Del. C22 ..... 7.625
Cleveland J5, R2 ..... 7.625
Coatesville,Pa. L7 ..... 7.925
Conshohocken,Pa. A3 .. 7.625
Economy,Pa. B14 ..... 7.625
Ecorse,Mich. G5 ..... 7.725
Fairfield,Ala. T2 ..... 7.625
Farrell,Pa. S3 ..... 7.625
Fontana,Calif.(30) K1 .. 8.425
Gary,Ind. U5 ..... 7.625
Geneva,Utah C11 ..... 7.625
Houston S5 ..... 7.725
Ind.Harbor,Ind. I-2, Y1 7.625
Johnstown,Pa. B2 ..... 7.625
Munhall,Pa. U5 ..... 7.625
Pittsburgh J5 ..... 7.625
Seattle B3 ..... 8.525
Sharon,Pa. S3 ..... 7.625
S.Chicago,Ill. U5, W14 7.625
SparrowsPoint,Md. B2 7.625
Warren,O. R2 ..... 7.625
Youngstown U5 ..... 7.625

PLATES, ALLOY
Aliquippa,Pa. J5 ..... 7.20
Claymont,Del. C22 ..... 7.20
Coatesville,Pa. L7 ..... 7.20
Economy,Pa. B14 ..... 7.20
Farrell,Pa. S3 ..... 7.20
Fontana,Calif.(30) K1 .. 8.00
Gary,Ind. U5 ..... 7.20
Houston S5 ..... 7.30
Ind.Harbor,Ind. Y1 .... 7.20
Johnstown,Pa. B2 ..... 7.20
Lowellville,O. S3 ..... 7.20
Munhall,Pa. U5 ..... 7.20
Newport,Ky. A2 ..... 7.20
Pittsburgh J5 ..... 7.20
Seattle B3 ..... 8.10
Sharon,Pa. S3 ..... 7.20
S.Chicago,Ill. U5, W14 .. 7.20
SparrowsPoint,Md. B2 .. 7.20
Youngstown Y1 ..... 7.20

FLOOR PLATES
Cleveland J5 ..... 6.175
Conshohocken,Pa. A3 .. 6.175
Ind.Harbor,Ind. I-2 .. 6.175
Munhall,Pa. U5 ..... 6.175
S.Chicago,Ill. U5 ..... 6.175

PLATES, Ingot Iron
Ashland c.l. (15) A10 .. 5.35
Ashland l.c.l. (15) A10 .. 5.85
Cleveland c.l. R2 ..... 5.85
Warren,O. c.l. R2 ..... 5.85

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 .. 5.425
Aliquippa,Pa.(9) J5 .... 5.425
Alton,Ill. L1 ..... 5.625
Atlanta(9) A11 ..... 5.625
Bessemer,Ala.(9) T2 .. 5.425
Birmingham(9) C15 .... 5.425
Bridgeport,Conn.(9) N19 5.65
Buffalo(9) R2 ..... 5.425
Clairton,Pa. (9) U5 .... 5.425
Cleveland(9) R2 ..... 5.425
Ecorse,Mich.(9) G5 .... 5.525
Emeryville,Calif. J7 .. 6.175
Fairfield,Ala.(9) T2 .. 5.425
Fairless,Pa. (9) U5 .... 5.575
Fontana,Calif.(9) K1 .. 6.125
Gary,Ind.(9) U5 ..... 5.425
Houston(9) S5 ..... 5.675
Ind.Harbor(9) I-2, Y1 5.425
Johnstown,Pa.(9) B2 .. 5.425
Joliet,Ill. P22 ..... 5.425
KansasCity,Mo.(9) S5 .. 5.675
Lackawanna(9) B2 .... 5.425
LosAngeles(9) B3 .... 6.125
Milton,Pa. M18 ..... 5.575
Minnequa,Colo. C10 .... 5.875
Niles,Calif. P1 ..... 6.125
N.T'wanda,N.Y.(46) B11 5.775
Pittsburg,Calif.(9) C11 .. 6.125
Pittsburgh(9) J5 ..... 5.425
Portland,Oreg. O4 ..... 6.175
Seattle B3, N14 ..... 6.175
S.Ch'c'go(9) R2,U5,W14 5.425
S.Duquesne,Pa.(9) U5 .. 5.425
S.SanFran.,Calif.(9) B3 6.175
Sterling,Ill.(1)(9) N15 .. 5.425
Sterling,Ill.(9) N15 .... 5.525
Struthers,O. Y1 ..... 5.425
Tonawanda,N.Y. B12 .... 5.425
Torrance,Calif.(9) C11 .. 6.125
Youngstown(9) R2, U5 .. 5.425

BARS, H.R. Leaded Alloy (Including leaded extra)
Warren,O. C17 ..... 7.475

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.475
Bethlehem,Pa. B2 ..... 6.475
Bridgeport,Conn. N19 .. 6.55
Buffalo R2 ..... 6.475
Canton,O. R2, T7 ..... 6.475
Clairton,Pa. U5 ..... 6.475
Detroit S41 ..... 6.475
Economy,Pa. B14 ..... 6.475
Ecorse,Mich. G5 ..... 6.575
Fairless,Pa. U5 ..... 6.625
Farrell,Pa. S3 ..... 6.475
Fontana,Calif. K1 ..... 7.525
Gary,Ind. U5 ..... 6.475
Houston S5 ..... 6.725
Ind.Harbor,Ind. I-2, Y1 6.475
Johnstown,Pa. B2 ..... 6.475
KansasCity,Mo. S5 .... 6.725
Lackawanna,N.Y. B2 .. 6.475
Lowellville,O. S3 ..... 6.475
LosAngeles B3 ..... 7.525
Massillon,O. R2 ..... 6.475
Midland,Pa. C18 ..... 6.475
Pittsburgh J5 ..... 6.475
Sharon,Pa. S3 ..... 6.475
S.Chicago R2, U5, W14 6.475
S.Duquesne,Pa. U5 .... 6.475
Struthers,O. Y1 ..... 6.475
Warren,O. C17 ..... 6.475
Youngstown U5 ..... 6.475

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ..... 7.925
Bessemer,Ala. T2 .... 7.925
Bethlehem,Pa. B2 ..... 7.925
Bridgeport,Conn. N19 .. 7.95
Clairton,Pa. U5 ..... 7.925
Cleveland R2 ..... 7.925
Ecorse,Mich. G5 ..... 8.025
Fairfield,Ala. T2 ..... 7.925
Fontana,Calif. K1 .... 8.625
Gary,Ind. U5 ..... 7.925
Houston S5 ..... 8.175
Ind.Harbor,Ind. Y1 .... 7.925
Johnstown,Pa. B2 ..... 7.925
KansasCity,Mo. S5 .... 8.175
Lackawanna,N.Y. B2 .. 7.925
LosAngeles B3 ..... 8.625
Pittsburgh J5 ..... 7.925
Seattle B3 ..... 8.675
S.Chicago,Ill. U5, W14 7.925
S.Duquesne,Pa. U5 .... 7.925
S.SanFrancisco B3 .... 8.675
Struthers,O. Y1 ..... 7.925
Youngstown U5 ..... 7.925

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 .. 5.575
Houston(9) S5 ..... 5.675
KansasCity,Mo.(9) S5 .. 5.675
Lackawanna(9) B2 .... 5.425
Sterling,Ill. N15 ..... 5.525
Sterling,Ill.(1) N15 .... 5.425
Tonawanda,N.Y. B12 .... 5.425

BAR SIZE ANGLES; S. Shapes
Aliquippa,Pa. J5 ..... 5.425
Atlanta A11 ..... 5.625
Joliet,Ill. P22 ..... 5.425
Niles,Calif. P1 ..... 6.125
Pittsburgh J5 ..... 5.425
Portland,Oreg. O4 ..... 6.175
SanFrancisco S7 ..... 6.275
Seattle B3 ..... 6.175

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ..... 6.55
Clairton,Pa. U5 ..... 6.55
Gary,Ind. U5 ..... 6.55
Houston S5 ..... 6.80
KansasCity,Mo. S5 .... 6.80
Pittsburgh J5 ..... 6.55
Youngstown U5 ..... 6.55

Bars, C.F., Leaded Alloy (Including leaded extra)
Ambridge,Pa. W18 ... 9.925
BeaverFalls,Pa. M12 .. 9.925
Camden,N.J. P13 ..... 10.10
Chicago W18 ..... 9.925
Cleveland C20 ..... 9.925
Elyria,O. W8 ..... 9.925
LosAngeles P2, S30
(Grade A) 11.30
(Grade B) 11.80
Monaca,Pa. S17 ..... 9.925
Newark,N.J. W18 .... 10.10
SpringCity,Pa. K3 .... 10.10
Warren,O. C17 ..... 9.925

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ... 7.30
BeaverFalls,Pa. M12,R2 7.30
Birmingham C15 ..... 7.90
Bridgeport,Conn. N19 .. 7.65
Buffalo B5 ..... 7.35
Camden,N.J. P13 ..... 7.75
Carnegie,Pa. C12 ..... 7.30
Chicago W18 ..... 7.30
Cleveland A7, C20 .... 7.30
Detroit B5, P17 ..... 7.50
Detroit S41 ..... 7.30
Donora,Pa. A7 ..... 7.30
Elyria,O. W8 ..... 7.30
FranklinPark,Ill. N5 ... 7.30
Gary,Ind R2 ..... 7.30
GreenBay,Wis. F7 ..... 7.30
Hammond,Ind. J5, L2 ... 7.30
Hartford,Conn. R2 .... 7.80
Harvey,Ill. B5 ..... 7.30
LosAngeles P2, S30 .... 8.75
LosAngeles R2 ..... 8.75
Mansfield,Mass. B5 .... 7.85
Massillon,O. R2, R8 .... 7.30
Midland,Pa. C18 ..... 7.30
Monaca,Pa. S17 ..... 7.30
Newark,N.J. W18 ..... 7.75
NewCastle,Pa.(17) B4 .. 7.30
Pittsburgh J5 ..... 7.30
Plymouth,Mich. P5 .... 7.55
Putnam,Conn. W18 .... 7.85
Readville,Mass. C14 .... 7.85
S.Chicago,Ill. W14 .... 7.30
SpringCity,Pa. K3 .... 7.75
Struthers,O. Y1 ..... 7.30
Warren,O. C17 ..... 7.30
Willimantic,Conn. J5 .... 7.80
Waukegan,Ill. A7 .... 7.30
Youngstown F3, Y1 .... 7.30

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19 6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ... 8.775
BeaverFalls,Pa. M12,R2 8.775
Bethlehem,Pa. B2 .... 8.775
Bridgeport,Conn. N19 .. 8.925
Buffalo B5 ..... 8.775
Camden,N.J. P13 ..... 8.95
Canton,O. T7 ..... 8.775
Carnegie,Pa. C12 ..... 8.775
Chicago W18 ..... 8.775
Cleveland A7, C20 .... 8.775
Detroit B5, P17 ..... 8.975
Detroit S41 ..... 8.775
Donora,Pa. A7 ..... 8.775
Elyria,O. W8 ..... 8.775
FranklinPark,Ill. N5 ... 8.775
Gary,Ind. R2 ..... 8.775
GreenBay,Wis. F7 ..... 8.775
Hammond,Ind. J5, L2 .. 8.775
Hartford,Conn. R2 .... 9.075
Harvey,Ill B5 ..... 8.775
Lackawanna,N.Y. B2 .. 8.775
LosAngeles P2, S30 .... 10.65
Mansfield,Mass. B5 .... 9.075
Massillon,O. R2, R8 .... 8.775
Midland,Pa. C18 ..... 8.775
Monaca,Pa. S17 ..... 8.775
Newark,N.J. W18 ..... 8.95
Plymouth,Mich. P5 .... 8.975
S.Chicago W14 ..... 8.775
SpringCity,Pa. K3 .... 8.95
Struthers,O. Y1 ..... 8.775
Warren,O. C17 ..... 8.775
Waukegan,Ill. A7 .... 8.775
Worcester,Mass. A7 .... 9.075
Youngstown F3, Y1 .... 8.775

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.425
Atlanta A11 .....5.625
Birmingham C15, S42 5.425
Bridgeport,Conn. N19 ...5.65
Buffalo R2 .....5.425
Cleveland R2 .....5.425
Ecorse,Mich. G5 .....5.775
Emeryville,Calif. J7 ..6.175
Fairfield,Ala. T2 .....5.425
Fairless,Pa. U5 .....5.575
Fontana,Calif. K1 ....6.125
Ft.Worth,Tex.(4)(26)T4 5.875
Gary, Ind. U5 .....5.425
Houston S5 .....5.675
Ind.Harbor,Ind. I-2,Y1 5.425
Johnstown,Pa. B2 ....5.425
Joliet,Ill. P22 .....5.425
KansasCity,Mo. S5 ....5.675
Lackawanna,N.Y. B2 ..5.425
LosAngeles B3 .....6.125
Milton,Pa. M18 .....5.575
Minnequa,Colo. C10 ...5.875
Niles,Calif. P1 .....6.125
Pittsburg,Calif. C11 ..6.125
Pittsburgh J5 .....5.425
Portland,Oreg. O4 ....6.175
SandSprings,Okla. S5 ..5.925
Seattle B3, N14 .....6.175
S.Chicago,Ill. R2 .....5.425
S.Duquesne,Pa. U5 ....5.425
S.SanFrancisco B3 ....6.175
SparrowsPoint,Md. B2 ..5.425
Sterling,Ill.(1) N15 ...5.425
Sterling, Ill. N15 .....5.525
Struthers,O. Y1 .....5.425
Tonawanda,N.Y. B12 ...6.00
Torrance,Calif. C11 ....6.125
Youngstown R2, U5 ..5.425

BARS, Reinforcing (Fabricated, to Consumers)

Boston B2 .....7.56
Chicago U8 .....6.91
Cleveland U8 .....6.89
Johnstown,Pa. B2 .....7.08
KansasCity,Mo. S5 .....7.35
Lackawanna,N.Y. B2 ..6.85
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.55
Pittsburgh J5, U8 ....7.10
Seattle B3, N14 .....7.70
SparrowsPt.,Md. B2 ....7.08
Williamsport,Pa. S19 ..7.00

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 14.45
Economy,Pa.(D.R.)B14 18.00
Economy,(Staybolt)B14 18.45

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.325
ChicagoHts.(4)(44) I-2 5.425
ChicagoHts.(4) C2 ....5.425
Ft.Worth,Tex.(26) T4 ..5.875
Franklin,Pa. (3) F5 ..5.325
Franklin,Pa. (4) F5 ..5.425
JerseyShore,Pa.(3) J8 ..5.30
Marion,O.(3) P11 ....5.325
Tonawanda(3) R12 ....5.325
Tonawanda(4) B12 ....6.00
Williamsport,Pa. (3)S19 5.50

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 .....4.925
Allenport,Pa. P7 .....4.925
Ashland,Ky.(8) A10 ..4.925
Cleveland J5, R2 ....4.925
Conshohocken,Pa. A3 ..4.975
Detroit(8) M1 .....5.025
Ecorse,Mich. G5 .....5.025
Fairfield,Ala. T2 ....4.925
Fairless,Pa. U5 .....4.975
Fontana,Calif. K1 ....5.825
Gary,Ind. U5 .....4.925
Geneva,Utah C11 .....5.025
GraniteCity,Ill.(8) G4 ..5.125
Ind.Harbor,Ind. I-2, Y1 4.925
Irvin,Pa. U5 .....4.92.
Lackawanna,N.Y. B2 ..4.925
Mansfield,O. E6 .....4.925
Munhall,Pa. U5 .....4.925
Newport,Ky.(8) A2 ..4.925
Niles,O. M21, S3 ....4.925
Pittsburg,Calif. C11 ..5.625
Pittsburgh J5 .....4.925
Portsmouth,O. P12 ....4.925
Riverdale,Ill. A1 .....4.925
Sharon,Pa. S3 .....4.925
S.Chicago,Ill. W14 ....4.925
SparrowsPoint,Md. B2. .4.925
Steubenville,O. W10 ...4.925
Warren,O. R2 .....4.925
Weirton,W.Va. W6 ....4.925
Youngstown U5, Y1 ..4.925

SHEETS, H.R., (19 Ga. & Lighter)

Niles,O. M21 .....6.05

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.10
Ind.Harbor,Ind. Y1 ....8.10
Irvin,Pa. U5 .....8.10
Munhall,Pa. U5 .....8.10
Newport,Ky. A2 .....8.10
Youngstown U5, Y1 ....8.10

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 ....7.275
Conshohocken,Pa. A3 ..7.325
Ecorse,Mich. G5 .....7.375
Fairfield,Ala. T2 ....7.275
Fairless,Pa. U5 .....7.325
Farrell,Pa. S3 .....7.275
Fontana,Calif. K1 ....8.175
Gary,Ind. U5 .....7.275
Ind.Harbor,Ind. I-2, Y1 7.275
Irvin,Pa. U5 .....7.275
Lackawanna (35) B2 ..7.275
Munhall,Pa. U5 .....7.275
Pittsburgh J5 .....7.275
S.Chicago,Ill. U5, W14 7.275
Sharon,Pa. S3 .....7.275
SparrowsPoint(36) B2. .7.275
Warren,O. R2 .....7.275
Weirton,W.Va. W6 ....7.275
Youngstown U5, Y1 ..7.275

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..5.175
Cleveland R2 .....5.675
Warren,O. R2 .....5.675

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.80
Middletown,O. A10 ....6.55
Warren,O. R2 .....6.80

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.05
Allenport,Pa. P7 .....6.05
Cleveland J5, R2 .....6.05
Conshohocken,Pa. A3 ..6.10
Detroit M1 .....6.05
Ecorse,Mich. G5 .....6.15
Fairfield,Ala. T2 .....6.05
Fairless,Pa. U5 .....6.10
Follansbee,W.Va. F4 ...6.05
Fontana, Calif. K1 ....7.30
Gary,Ind. U5 .....6.05
GraniteCity,Ill. G4 ....6.25
Ind.Harbor,Ind. I-2, Y1 6.05
Irvin,Pa. U5 .....6.05
Lackawanna,N.Y. B2 ..6.05
Mansfield,O. E6 .....6.05
Middletown,O. A10 ....6.05
Newport,Ky. A2 .....6.05
Pittsburg,Calif. C11 ..7.00
Pittsburgh J5 .....6.05
Portsmouth,O. P12 ....6.05
SparowsPoint,Md. B2 ..6.05
Steubenville,O. W10 ....6.05
Warren,O. R2 .....6.05
Weirton,W.Va. W6 ....6.05
Yorkville, O. W10 ....6.05
Youngstown Y1 .....6.05

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.975
Ecorse, Mich. G5 .....9.075
Fairless,Pa. U5 .....9.025
Fontana,Calif. K1 ....10.275
Gary,Ind. U5 .....8.975
IndianaHarbor,Ind. Y1 8.975
Irvin,Pa. U5 .....8.975
Lackawanna (37) B2 ..8.975
Pittsburgh J5 .....8.975
SparrowsPoint (38) B2 8.975
Warren,O. R2 .....8.975
Weirton,W.Va. W6 ....8.975
Youngstown Y1, ...8.975

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	.6.95	7.20
Canton,O. R2	....6.95	7.45
Fairfield T2	....6.95	7.20
Gary,Ind. U5	....6.95	7.20
GraniteCity,Ill. G4	7.15	...
Ind.Harbor I-2	...6.95	7.20
Irvin,Pa. U5	....6.95	7.20
Kokomo,Ind. C16	..7.05	...
MartinsFry. W10	.6.95	7.20
Pitts.,Calif. C11	..7.70	...
Pittsburgh J5	....6.95	...
SparrowsPt. B2	..6.95	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 .. 7.20

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.60‡
Ashland,Ky. A10 .....6.60†
Canton,O. R2 .....6.60‡
Dover,O. R1 .....6.60†
Fairfield,Ala. T2 .....6.60†
Gary,Ind. U5 .....6.00*
GraniteCity,Ill. G4 ....6.80*
Ind.Harbor,Ind. I-2 ....6.60†
Irvin,Pa. U5 .....6.60*
Kokomo,Ind. C16 ....6.70‡
MartinsFerry,O. W10 ..6.60*
Middletown,O. A10 ....6.60†
Pittsburg,Calif. C11 ....7.35*
Pittsburgh J5 .....6.60†
SparrowsPt.,Md. B2 ....6.60†
Warren,O. R2 .....6.60†
Weirton,W.Va. W6 ....6.60*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.725
SparrowsPt.(39) B2 ...9.725

SHEETS, Galvannealed Steel

Canton,O. R2 .....7.00
Irvin,Pa. U5 .....7.00

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.85
Middletown,O. A10 ....6.85

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.425
Niles,O.(28) R2 .....7.425
Weirton,W.Va. W6 ...7.275

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) .9.25
Butler,Pa. A10 (type 2) .9.35

SHEETS, Enameling Iron

Ashland,Ky. A10 .....6.625
Cleveland R2 .....6.625
Gary,Ind. U5 .....6.625
GraniteCity,Ill. G4 ....6.825
Ind.Harbor,Ind. I-2,Y1 6.625
Irvin,Pa. U5 .....6.625
Middletown,O. A10 ....6.625
Niles,O. M21, S3 .....6.625
Youngstown Y1 .....6.625

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...8.65
Ind.Harbor,Ind. I-2 ...8.475
Yorkville,O. W10 .....8.475

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.00
Gary,Ind. U5 .....7.00
Mansfield,O. E6 .....7.00
Middletown,O. A10 ....7.00
Niles,O. M21, S3 .....7.00
Warren,O. R2 .....7.00
Weirton,W.Va. W6 ....7.00

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....7.40

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve.Cold Rolling Mills
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Prod. Dept., Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md.Fine & Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelson Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Work
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service
S41 Stainless Steel Div., J&L Steel Corp.
S42 Southern Elec. Steel Co.
T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala City, Ala. (27) R2 ..4.925
Allenport, Pa. P7 .....4.925
Alton, Ill. L1 .....5.125
Ashland, Ky. (8) A10 ..4.925
Atlanta A11 .....5.125
Bessemer, Ala. T2 ....4.925
Birmingham C15 .....4.925
Buffalo (27) R2 .....4.925
Conshohocken, Pa. A3 ..4.975
Detroit M1 .....5.025
Ecorse, Mich. G5 .....5.025
Fairfield, Ala. T2 ....4.925
Fontana, Calif. K1 ....5.825
Gary, Ind. U5 .....4.925
Ind. Harbor, Ind. I-2, Y1 4.925
Johnstown, Pa. (25) B2 ..4.925
Lackawanna, N.Y. (25) B2 4.925
Los Angeles (25) B3 ....5.675
Minnequa, Colo. C10 ..6.025
Pittsburg, Calif. C11 ..5.675
Riverdale, Ill. A1 .....4.925
San Francisco S7 .....6.35
Seattle (25) B3 .....6.35
Seattle N14 .....6.35
Sharon, Pa. S3 .....4.925
S San Francisco (25) B3 5.675
Sparrows Point, Md. B2 4.925
Sterling, Ill. (1) N15 ..4.925
Sterling, Ill. N15 .....5.025
Torrance, Calif. C11 ..5.675
Warren, O. R2 .....4.925
Weirton, W. Va. W6 ....4.925
Youngstown U5 .....4.925

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18 .....8.10
Farrell, Pa. S3 .....8.10
Gary, Ind. U5 .....8.10
Houston S5 .....8.35
Ind. Harbor, Ind. Y1 ....8.10
Kansas City, Mo. S5 ....8.35
Los Angeles B3 .....9.30
Lowellville, O. S3 .....8.10
Newport, Ky. A2 .....8.10
Sharon, Pa. S3 .....8.10
S. Chicago, Ill. W14 ....8.10
Youngstown U5, Y1 ....8.10

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer, Ala. T2 ....7.325
Conshohocken, Pa. A3 ..7.325
Ecorse, Mich. G5 .....7.425
Fairfield, Ala. T2 ....7.325
Farrell, Pa. S3 .....7.325
Gary, Ind. U5 .....7.325
Ind. Harbor, Ind. I-2, Y1 7.325
Lackawanna, N.Y. B2..7.325
Los Angeles (25) B3 ....8.075
Seattle (25) B3 .....8.325
Sharon, Pa. S3 .....7.325
S. Chicago, Ill. W14 ....7.325
S San Francisco (25) B3 8.075
Sparrows Point, Md. B2..7.325
Warren, O. R2 .....7.325
Weirton, W. Va. W6 ....7.325
Youngstown U5, Y1 ..7.325

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10 ..5.175
Warren, O. R2 .....5.675

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6 .....7.15
Baltimore T6 .....7.15
Boston T6 .....7.70
Buffalo S40 .....7.15
Cleveland A7, J5 .....7.15
Conshohocken, Pa. A3 ..7.20
Dearborn, Mich. D3 ....7.25
Detroit D2, M1, P20 ...7.25
Dover, O. G6 .....7.15
Ecorse, Mich. G5 .....7.25
Evanston, Ill. M22 .....7.25
Follansbee, W. Va. F4 ..7.15
Fontana, Calif. K1 .....9.00
Franklin Park, Ill. T6 ..7.25
Ind. Harbor, Ind. Y1 ....7.15
Indianapolis J5 .....7.30
Los Angeles J5 .....9.05
Los Angeles C1 .....9.20
New Bedford, Mass. R10..7.60
New Britain (10) S15 ....7.15
New Castle, Pa. B4, E5 ..7.15
New Haven, Conn. D2 ....7.60
New Kensington, Pa. A6..7.15
Pawtucket, R.I. R3 .....7.80
Pawtucket, R.I. N8 .....7.70
Philadelphia (45) P24 ...7.70
Pittsburgh J5 .....7.15
Riverdale, Ill. A1 .....7.25
Rome, N.Y. (32) R6 ....7.15
Sharon, Pa. S3 .....7.15
Trenton, N.J. (31) R5..8.60
Wallingford, Conn. W2 ..7.60
Warren, O. R2, T5 .....7.15
Weirton, W. Va. W6 ....7.15
Worcester, Mass. A7 ....7.70
Youngstown J5, Y1 ....7.15

STRIP, Cold-Rolled Alloy High-Strength, Low-Alloy

Boston T6 .....15.40
Carnegie, Pa. S18 ....15.05
Cleveland A7 .....15.25
Dover, O. G6 .....15.05
Farrell, Pa. S3 .....15.05
Franklin Park, Ill. T6 ..15.05
Harrison, N.J. C18 ....15.05
Indianapolis J5 .....15.20
Lowellville, O. S3 ....15.05
Pawtucket, R.I. N8 ....15.40
Riverdale, Ill. A1 .....15.05
Sharon, Pa. S3 .....15.05
Worcester, Mass. A7 ...15.55
Youngstown J5 .....15.05

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7 .....10.45
Dearborn, Mich. D3 ....10.60
Dover, O. G6 .....10.45
Ecorse, Mich. G5 .....10.55
Farrell, Pa. S3 .....10.50
Ind. Harbor, Ind. Y1 ...10.65
Sharon, Pa. S3 .....10.50
Warren, O. R2 .....10.45
Weirton, W. Va. W6 ....10.50
Youngstown Y1 .....10.65

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2 .....7.90

STRIP, C.R. Electrogalvanized

Cleveland A7 .....7.15*
Dover, O. G6 .....7.15*
Evanston, Ill. M22 ....7.25*
Riverdale, Ill. A1 .....7.25*
Warren, O. B9, T5 ....7.15*
Worcester, Mass. A7 ..7.70*
Youngstown J5 .....7.15*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon, Pa. S3 .....7.275

TIGHT COOPERAGE HOOP

Atlanta A11	5.65
Riverdale, Ill. A1	5.50
Sharon, Pa. S3	5.35
Youngstown U5	5.35

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W1	...	10.70	12.90	16.10	19.30
Carnegie, Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn, Mich. D3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover, O. G6	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. M22	8.95	10.40	12.60	....	....
Fostoria, O. S1	10.05	11.15	13.10	16.10	....
Franklin Park, Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison N.J. C18	...	...	12.90	16.10	19.30
Indianapolis J5	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	....
Los Angeles J5	11.15	12.60	14.80	....	....
New Britain, Conn. (10) S15	8.95	10.40	12.60	15.60	18.55
New Castle, Pa. B4, E5	8.95	10.40	12.60	15.60	....
New Haven, Conn. D2	9.40	10.70	12.90	15.90	....
New Kensington, Pa. A6	8.95	10.40	12.60	15.60	....
New York W3	...	10.70	12.90	16.10	19.30
Pawtucket, R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome, N.Y. (32) R6	8.95	10.40	12.60	15.60	18.55
Sharon, Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton, N.J. R5	...	10.70	12.90	16.10	19.30
Wallingford, Conn. W2	9.40	10.70	12.90	15.90	18.75
Warren, O. T5	8.95	10.40	12.60	15.60	18.55
Worcester, Mass. A7, T6	8.95	10.70	12.90	15.90	18.85
Youngstown J5	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	18.10	21.95	26.30
Buffalo W12	18.10	....	....
Fostoria, O. S1	18.30	22.15	....
Franklin Park, Ill. T6	18.45	22.30	26.65
Harrison, N.J. C18	18.10	21.95	26.30
New York W3	18.10	21.95	26.30
Palmer, Mass. W12	18.10	....	....
Trenton, N.J. R5	18.10	21.95	26.30
Worcester, Mass. A7, T6	18.10	21.95	26.30
Youngstown J5	18.45	22.30	26.65

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W. Va. W10	....	....	11.80	12.90	13.95
Mansfield, O. E6	9.625	11.10	11.80	12.90	13.95
Newport, Ky. A2	9.625	11.10	11.80	12.90	13.95
Niles, O. M21, S3	9.625	11.10	11.80	12.90	....
Vandergrift, Pa. U5	....	11.10	11.80	12.90	13.95
Warren, O. R2	9.625	11.10	11.80	12.90	....
Zanesville, O. A10	....	....	11.80	12.90	13.95
Zanesville, O. A10 (SP Coils)	....	....	11.55	12.65	13.70

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W. Va. W10	....	11.35	12.05	13.15	14.20
Brackenridge, Pa. A4	....	....	12.05	13.15	14.20
Granite City, Ill. G4	....	9.825*11.05*	11.75*	12.85*	....
Indiana Harbor, Ind. I-2..	9.625†10.85*		11.55*	12.65*	....
Mansfield, O. E6	....	9.625*11.35	12.05	13.50	14.20
Vandergrift, Pa. U5	....	9.625*11.35	12.05	13.15	14.20
Warren, O. R2	....	9.625*11.35	12.05	13.15	14.20
Zanesville, O. A10 (FP coils)	....	11.35	12.05	13.15	14.20

H.R. SHEETS (22Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
Beech Bottom, W. Va. W10	15.00	15.55	16.05	17.10
Vandergrift, Pa. U5	14.75	15.55	16.05	17.10
Zanesville, O. A10	15.00	15.55	16.05	17.10

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	17.60	19.20	19.70	20.20	....
Butler, Pa. A10	....	....	....	19.20	19.70	20.20	....
Vandergrift, Pa. U5	..	16.60	17.60	19.20	19.70	20.20	15.25**
Warren, O. R2	....	....	....	....	....	....	15.25‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$8.75	$9.00	$9.40
Fairfield, Ala. T2	8.85	9.10	9.50
Fairless, Pa. U5	8.85	9.10	9.50
Fontana, Calif. K1	9.50	9.75	10.15
Gary, Ind. U5	8.75	9.00	9.40
Granite City, Ill. G4	8.85	9.10	9.50
Indiana Harbor, Ind. I-2, Y1	8.75	9.00	9.40
Irvin, Pa. U5	8.75	9.00	9.40
Niles, O. R2	8.75	9.00	9.40
Pittsburg, Calif. C11	9.50	9.75	10.15
Sparrows Point, Md. B2	8.85	9.10	9.50
Weirton, W. Va. W6	8.75	9.00	9.40
Yorkville, O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa, Pa. J5	7.725	7.925	....
Niles, O. R2	7.725	7.925	8.125

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.05	$10.30
Fairfield, Ala. T2	10.15	10.40
Fairless, Pa. U5	10.15	10.40
Fontana, Calif. K1	10.80	11.05
Gary, Ind. U5	10.05	10.30
Irvin, Pa. U5	10.05	10.30
Pitts., Calif. C11	10.80	11.05
Sp. Pt., Md. B2	10.15	10.40
Weirton, W. Va. W6	10.05	10.30
Yorkville, O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$7.85
Fairfield, Ala. T2	7.95
Fairless, Pa. U5	7.95
Fontana, Calif. K1	8.60
Gary, Ind. U5	7.85
Granite City, Ill. G4	7.95
Ind. Harbor, Ind. I-2, Y1	7.85
Irvin, Pa. U5	7.85
Niles, O. R2	7.85
Pittsburg, Calif. C11	8.60
Sparrows Point, Md. B2	7.95
Weirton, W. Va. W6	7.85
Yorkville, O. W10	7.85

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa, Pa. J5	$7.50
Gary, Ind. U5	7.50
Granite City, Ill. G4	7.60
Ind. Harbor, Ind. Y1	7.50
Irvin, Pa. U5	7.50
Yorkville, O. W10	7.50

MANUFACTURING TERNES (Special Coated, Base Box)

Gary, Ind. U5	$9.70
Irvin, Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated, Base Box)

Gary, Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2 ..7.65
Aliquippa, Pa. J5 .....7.65
Alton, Ill. L1 .....7.85
Atlanta A11 .....7.85
Bartonville, Ill. K4 .....7.75
Buffalo W12 .....7.65
Chicago W13 .....7.65
Cleveland A7, C20 .....7.65
Crawfordsville, Ind. M8..7.75
Donora, Pa. A7 .....7.65
Duluth A7 .....7.65
Fairfield, Ala. T2 .....7.65
Fostoria, O. (24) S1 ....7.75
Houston S5 .....7.90
Jacksonville, Fla. M8 ..8.00
Johnstown, Pa. B2 .....7.65
Joliet, Ill. A7 .....7.65
Kansas City, Mo. S5 ....7.90
Kokomo, Ind. C16 .....7.75
Los Angeles B3 .....8.60
Minnequa, Colo. C10 ....7.90
Monessen, Pa. P7, P16 ..7.65
N. Tonawanda, N.Y. B11 7.65
Palmer, Mass. W12 ....7.95
Pittsburg, Calif. C11 ..8.60
Portsmouth, O. P12 ....7.65
Rankin, Pa. A7 .....7.65
S. Chicago, Ill. R2 .....7.65
S San Francisco C10 ....8.60
Sparrows Point, Md. B2..7.75
Sterling, Ill. (1) N15 ....7.65
Sterling, Ill. N15 .....7.75
Struthers, O. Y1 .....7.65
Waukegan, Ill. A7 .....7.65
Worcester, Mass. A7 ....7.95

WIRE, Gal'd ACSR for Cores

Bartonville, Ill. K4 ....12.65
Buffalo W12 .....12.65
Cleveland A7 .....12.65
Donora, Pa. A7 .....12.65
Duluth A7 .....12.65
Johnstown, Pa. B2 .....12.65
Minnequa, Colo. C10 ....12.775
Monessen, Pa. P16 .....12.65
Muncie, Ind. I-7 .....12.85
New Haven, Conn. A7 ....12.95
Palmer, Mass. W12 .....12.95
Pittsburg, Calif. C11 ....13.45
Portsmouth, O. P12 .....12.65
Roebling, N.J. R5 .....12.95
Sparrows Pt., Md. B2 ....12.75
Struthers, O. Y1 .....12.65
Trenton, N.J. A7 .....12.95
Waukegan, Ill. A7 .....12.65
Worcester, Mass. A7 ....12.95

WIRE, Upholstery Spring

Aliquippa, Pa. J5 .....9.30
Alton, Ill. L1 .....9.50
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora, Pa. A7 .....9.30
Duluth A7 .....9.30
Johnstown, Pa. B2 .....9.30
Kansas City, Mo. S5 ....9.55
Los Angeles B3 .....10.25
Minnequa, Colo. C10 ....9.50
Monessen, Pa. P7, P16 ..9.30
New Haven, Conn. A7 ....9.60
Palmer, Mass. W12 .....9.60
Pittsburg, Calif. C11 ..10.25
Portsmouth, O. P12 .....9.30
Roebling, N.J. R5 .....9.60
S. Chicago, Ill. R2 .....9.30
S San Francisco C10 ....10.25
Sparrows Pt., Md. B2 ....9.40
Struthers, O. Y1 .....9.30
Trenton, N.J. A7 .....9.60
Waukegan, Ill. A7 .....9.30
Worcester, Mass. A7 ....9.60

WIRE, MB Spring, High Carbon

Aliquippa, Pa. J5 .....9.30
Alton, Ill. L1 .....9.50
Bartonville, Ill. K4 .....9.40
Buffalo W12 .....9.30
Cleveland A7 .....9.30
Donora, Pa. A7 .....9.30
Duluth A7 .....9.30
Fostoria, O. S1 .....9.35
Johnstown, Pa. B2 .....9.30
Kansas City, Mo. S5 ....9.55
Los Angeles B3 .....10.25
Millbury, Mass. (12) N6 ..9.60
Minnequa, Colo. C10 ....9.50
Monessen, Pa. P7, P16 ..9.30
Muncie, Ind. I-7 .....9.50
Palmer, Mass. (12) W12 ..9.60
Pittsburg, Calif. C11 ..10.25
Portsmouth, O. P12 .....9.30
Roebling, N.J. R5 .....9.60
S. Chicago, Ill. R2 .....9.30
S San Francisco C10 ....10.25
Sparrows Pt., Md. B2 ....9.40
Struthers, O. Y1 .....9.30
Trenton, N.J. A7 .....9.60
Waukegan, Ill. A7 .....9.30
Worcester, A7, J4, T6 ..9.60

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1 .....15.80
Bartonville, Ill. K4 ....15.70
Buffalo W12 .....15.60
Chicago W13 .....15.60
Cleveland A7 .....15.60
Crawfordsville, Ind. M8 15.70
Fostoria, O. S1 .....15.60
Houston S5 .....15.85
Jacksonville, Fla. M8 ..15.95
Johnstown, Pa. B2 .....15.60
Kansas City, Mo. S5 ....15.85
Kokomo, Ind. C16 .....15.60
Minnequa, Colo. C10 ....15.85
Monessen, Pa. P7, P16..15.60
Muncie, Ind. I-7 .....15.80
Palmer, Mass. W12 .....15.90
S San Francisco C10 ....16.45
Waukegan, Ill. A7 .....15.60
Worcester, Mass. A7, T6 15.90

ROPE WIRE

Bartonville, Ill. K4 ....12.75
Buffalo W12 .....12.75
Fostoria, O. S1 .....12.75
Johnstown, Pa. B2 .....12.75
Monessen, Pa. P7 .....12.75
Muncie, Ind. I-7 .....12.95
Palmer, Mass. W12 .....13.05
Portsmouth, O. P12 .....12.75
Roebling, N.J. R5 .....13.05
Sparrows Pt., Md. B2 ....12.85
Struthers, O. Y1 .....12.75
Worcester, Mass. J4 ....13.05

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Tire Bead

Bartonville,Ill. K4	16.55
Monessen,Pa. P16	16.55
Roebling,N.J. R5	17.05

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	11.65
Baltimore T6	11.95
Boston T6	11.95
Buffalo W12	11.65
Chicago W13	11.75
Cleveland A7	11.65
Crawfordsville,Ind. M8	11.65
Dover,O. G6	11.65
Fostoria,O. S1	11.95
FranklinPark,Ill. T6	11.75
Kokomo,Ind. C16	11.65
Massillon,O. R8	11.65
Milwaukee C23	11.85
Monessen,Pa. P7, P16	11.65
Palmer,Mass. W12	11.95
Pawtucket,R.I. N8	11.95
Philadelphia P24	11.95
Riverdale,Ill. A1	11.75
Rome,N.Y. R6	11.65
Sharon,Pa. S3	11.65
Trenton,N.J. R5	11.95
Warren,O. B9	11.65
Worcester,Mass. A7, T6	11.95

NAILS, Stock — **Col.**

AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	175
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Houston,Tex. S5	178
Fairfield,Ala. T2	173
Jacksonville,Fla.(20) M8	184
Joliet,Ill. A7	173
Johnstown,Pa. B2	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.95

NAILS, Cut (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.80
Wheeling W Va. W10	9.80

POLISHED STAPLES — **Col.**

AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	175
Atlanta A11	177
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	177
Donora,Pa. A7	175
Duluth A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla.(20) M8	186
Joliet,Ill. A7	175
Johnstown,Pa. B2	175
Kokomo,Ind. C16	177
Minnequa,Colo. C10	180
Pittsburg,Calif. C11	194
Rankin,Pa. A7	175
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	181

TIE WIRE, Automatic Baler (14½ Ga.;Per 97 lb Net Box)

Coil No. 3150

AlabamaCity,Ala. R2	$10.26
Atlanta A11	10.36
Bartonville,Ill. K4	10.36
Buffalo W12	9.82
Chicago W13	10.26
Crawfordsville,Ind. M8	10.36
Donora,Pa. A7	10.26
Duluth A7	10.26
Fairfield,Ala. T2	10.26
Houston S5	10.51
Jacksonville,Fla. M8	10.82
Johnstown,Pa. B2	10.26
Joliet,Ill. A7	10.26
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	10.36
LosAngeles B3	11.05
Minnequa,Colo. C10	10.51
Pittsburg,Calif. C11	11.04
S.Chicago,Ill. R2	10.26
S.SanFrancisco C10	11.04
SparrowsPt.,Md. B2	10.36
Sterling,Ill.(37) N15	10.36

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$10.60
Atlanta A11	10.70
Bartonville,Ill. K4	10.70
Buffalo W12	10.15
Chicago W13	10.60
Crawfordsville,Ind. M8	10.70
Donora,Pa. A7	10.60
Duluth A7	10.60
Fairfield,Ala. T2	10.60
Houston S5	10.85
Jacksonville,Fla. M8	11.16
Johnstown,Pa. B2	10.60
Joliet,Ill. A7	10.60
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	10.70
LosAngeles B3	11.40
Minnequa,Colo. C10	10.85
Pittsburg,Calif. C11	11.40
S.Chicago,Ill. R2	10.60
S.SanFrancisco C10	11.40
SparrowsPt.,Md. B2	10.70
Sterling,Ill.(37) N15	10.70

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$10.65
Atlanta A11	10.75
Bartonville,Ill. K4	10.75
Buffalo W12	10.20
Chicago W13	10.65
Crawfordsville,Ind. M8	10.75
Donora,Pa. A7	10.65
Duluth A7	10.65
Fairfield,Ala. T2	10.65
Houston S5	10.90
Jacksonville,Fla. M8	11.21
Johnstown,Pa. B2	10.65
Joliet,Ill. A7	10.65
KansasCity,Mo. S5	10.90
Kokomo,Ind. C16	10.75
LosAngeles B3	11.45
Minnequa,Colo. C10	10.90
Pittsburg,Calif. C11	11.45
S.Chicago,Ill. R2	10.65
S.SanFrancisco C10	11.45
SparrowsPt.,Md. B2	10.75
Sterling,Ill.(37) N15	10.75

BALE TIES, Single Loop — **Col.**

AlabamaCity,Ala. R2	212
Atlanta A11	214
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	219
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
Sterling,Ill.(7) N15	214
SparrowsPt.,Md B2	214
Williamsport,Pa. S19	175

FENCE POSTS

Birmingham C15	171
ChicagoHts.,Ill. C2, I-2	172
Duluth A7	172
Franklin,Pa. F5	172
Huntington,W.Va. C15	171
Johnstown,Pa. B2	172
Marion,O. P11	172
Minnequa,Colo. C10	177
Sterling,Ill.(1) N15	172
Tonawanda,N.Y. B12	174

WIRE, Barbed — **Col.**

AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190§
Atlanta A11	198*
Bartonville,Ill. K4	198
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston,Tex. S5	198**
Jacksonville,Fla. M8	203
Johnstown,Pa. B2	196§
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196*
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213**
SparrowsPoint,Md. B2	198§
Sterling,Ill.(7) N15	198§

WOVEN FENCE, 9-15 Ga. — **Col.**

Ala.City,Ala. R2	187**
Aliq'ppa,Pa.9-14½ga.J5	190§
Atlanta A11	192*
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston,Tex. S5	192**
Jacksonville,Fla. M8	197
Johnstown,Pa.(43) B2	190§
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192§

WIRE (16 gage)	An'ld Stone	Galv. Stone
Ala.City,Ala.R2	17.15	18.70**
Aliq'ppa,Pa.	J5.17.15	18.95
Bartonville,Ill.	K4 ..17.25	19.05
Cleveland A7	...17.15	....
Crawf'dsville,Ind.	M8 17.25	19.05
Fostoria,O.	S1 ..17.65	19.20†
Houston S5	....17.40	18.95**
Jacksonville	M8.17.50	19.30
Johnstown B2	..17.15	18.95§
Kan.City,Mo.	S5 17.40	....
Kokomo C16	...17.25	18.80†
Minnequa C10	..17.40	18.95**
P'lm'r,Mass.	W12 17.45	19.00†
Pitts.,Calif.	C11.17.50	19.05†
SparrowsPt.	B2. 17.25	19.05§
Sterling(37)	N15.17.25	19.05§
Waukegan A7	..17.15	18.70†
Worcester A7	...17.45	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	8.65	9.20**
Aliquippa J5	8.65	9.325§
Atlanta(48) A11	8.75	9.425*
Bartonville(48) K4	8.75	9.425
Buffalo W12	8.65	9.20†
Cleveland A7	8.65	....
Crawfordsville M8	8.75	9.425
Donora,Pa. A7	8.65	9.20†
Duluth A7	8.65	9.20†
Fairfield T2	8.65	9.20†
Houston(48) S5	8.90	9.45**
Jacks'ville,Fla. M8	9.00	9.675
Johnstown B2(48)	8.65	9.325§
Joliet,Ill. A7	8.65	9.20†
Kans.City(48)	85.8.90	9.45**
Kokomo C16	8.75	9.30†
LosAngeles B3	9.60	10.275§
Minnequa C10	8.90	9.45**
Monessen P7(48)	8.65	9.25*
Palmer,Mass. W12	8.95	9.50†
Pitts.,Calif. C11	9.60	10.15†
Rankin,Pa. A7	8.65	9.20†
S.Chicago R2	8.65	9.20**
S.SanFran. C10	9.60	10.15**
Spar'wsPt.B2(48)	8.75	9.425§
Sterling(48) N15	8.90	9.575§
Sterling(1)(48)	8.80	9.475§
Struth'rs,O.(48)Y1	8.65	9.30†
Worcester,Mass. A7	8.95	9.50†

Based on zinc price of: *13.50c. †5c. ‖10c. ‡Less than 10c. ††10.50c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	49.0
Longer than 6 in.	39.0
⅝ in. thru 1 in.:	
6 in. and shorter	39.0
Longer than 6 in.	35.0
1⅛ in. and larger:	
All lengths	35.0

Undersized Body (rolled thread)

½ in. and smaller:	
6 in. and shorter	49.0

Carriage, Machine, Lag Bolts

Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	29.0
Longer than 6 in.	15.0
⅝ in. and larger:	
All lengths	12.0

Lag Bolts (all diam.)

6 in. and shorter	49.0
Longer than 6 in.	39.0

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	49.0
Larger than ½ in. or longer than 6 in.	39.0
Blank Bolts	39.0
Step, Elevator, Tire Bolts	49.0

Stove Bolts, Slotted:

⅛ to ¼-in. incl., 3 in. and shorter	55.0
⅛ to ⅜ in., inclusive	55.0

NUTS

Reg. & Heavy Square Nuts:

All sizes	55.5

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	41.0

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅜ in. and smaller	60.5
⅞ in. to 1 in., incl.	55.5
1⅛ in. to 1½ in., incl.	58.5
1⅝ in. and larger	53.5

Hex Nuts, Reg. & Heavy, Cold Punched:

⅜ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	53.5

Hex Nuts, All Types, Hot Galvanized:

⅜ in. and smaller	46.5
⅞ in. to 1 in., incl.	41.5
1⅛ in. to 1½ in., incl.	46.5

Hex Nuts, Semifinished, Heavy (Incl. Slotted):

⅜ in. and smaller	60.5
⅞ in. to 1½ in., incl.	55.5
1⅝ in. and larger	56.5

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

Semifinished Hex Nuts, Reg. (Incl. Slotted):

⅜ in. and smaller	60.5
⅞ in. to 1 in., incl.	63.0
1⅛ in. to 1½ in., incl.	59.0
1⅝ in. and larger	53.5

CAP AND SETSCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Capscrews, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅜ in. and smaller	40.6
⅞, ⅞ and 1 in. diam.	22.0
Longer than 6 in.:	
⅜ in. and smaller	8.0
⅞, ⅞ and 1 in. diam.	+6.0

High Carbon, Heat Treated:

6 in. and shorter:	
⅜ in. and smaller	26.0
⅞, ⅞ and 1 in. diam.	3.0
Longer than 6 in.:	
⅜ in. and smaller	+13.0
⅞, ⅞ and 1 in. diam.	+32.0

Flat Head Capscrews:

⅜ in. and smaller	+76.0

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam:	
6 in. and shorter	Net
Longer than 6 in.	+23

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.25

7/8 in. under: List less 19%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D.	B.W.	Seamless		Elec. Weld
In.	Gage	H.R.	C.D.	H.R.
1	13	....	25.98	23.54
1¼	13	....	30.78	23.36
1½	13	29.03	34.01	25.83
1¾	13	34.29	40.18	30.51
2	13	38.44	45.05	34.20
2¼	13	43.29	50.75	38.52
2½	12	46.99	55.06	41.81
2¾	12	51.76	60.65	46.05
3	12	56.04	65.67	49.88
3½	12	59.76	70.03	53.19

RAILWAY MATERIALS

RAILS	Standard No. 1	Standard No. 2	Standard All	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.525	5.425	....	6.50
Ensley,Ala. T2	5.525	5.425	....	6.50
Fairfield,Ala. T2	....	....	....	6.50
Huntington,W.Va. C15	....	....	....	6.50
Gary,Ind. U5	5.525	5.425	....	....
IndianaHarbor,Ind. I-2	5.525	5.425	5.475	....
Johnstown,Pa. B2	....	....	...(16)	6.50
Lackawanna,N.Y. B2	5.525	5.425	....	6.50
Minnequa,Colo. C10	5.525	5.425	....	7.00
Steelton,Pa. B2	5.525	5.425	....	....
Williamsport,Pa. S19	....	....	....	6.50

TIE PLATES

Fairfield,Ala. T2	6.60
Gary,Ind. U5	6.60
Ind.Harbor,Ind. I-2	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Seattle B3	6.75
Steelton,Pa. B2	6.60
Torrance Calif. C11	6.75

JOINT BARS

Bessemer,Pa. U5	6.975
Fairfield,Ala. T2	6.975
Ind.Harbor,Ind. I-2	6.975
Joliet,Ill. U5	6.975
Lackawanna,N.Y. B2	6.975
Minnequa,Colo. C10	6.975
Steelton,Pa. B2	6.975

AXLES

Ind.Harbor,Ind. S13	8.775
Johnstown,Pa. B2	8.775

TRACK BOLTS, Untreated

Cleveland R2	14.75
KansasCity,Mo. S5	14.75
Lebanon,Pa. B2	14.75
Minnequa,Colo. C10	14.75
Pittsburgh P14	14.75
Seattle B3	15.25

SCREW SPIKES

Lebanon,Pa. B2	14.50

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.75
Ind.Harbor,Ind. I-2, Y1	9.75
KansasCity,Mo. S5	9.75
Lebanon,Pa. B2	9.75
Minnequa,Colo. C10	9.75
Pittsburgh J5	9.75
Seattle B3	10.25
S.Chicago Ill. R2	9.75
Struthers,O. Y1	9.75
Youngstown R2	9.75

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1½ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in., 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 13 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ¾" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 1000 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.15c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 6.045c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.60c, for widths ⅝ in. and under br 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 72" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(45) 0.022 in. and lighter, over 0.022", 8.20c.
(46) Special quality.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds; 8.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Ambridge, Pa. N2	+9.25	....	+2.75	....	+0.25	....	1.25	....	1.25	....	1	....	3.5	....
Lorain, O. N3	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25
Youngstown Y1	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

ELECTRIC STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+9.25	+24.25	+2.75	+19.5	+0.25	+17	1.25	+15.5	1.25	+15.5	1	+15.75	3.5	+13.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		8c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Alton, Ill. L1	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Benwood, W. Va. W10	4.5	+22	+7.5	+31	+18	+39.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Butler, Pa. F6	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Fairless, Pa. N3	....	....	....	....	....	....	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Fontana, Calif. K1	....	....	....	....	....	....	+8.25	+23.5	+5.25	+19.5	+1.75	+15	0.75	+14.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	4.25	+11	7.25	+7	10.75	+2.5	13.25	+3.25
Lorain, O. N3	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sharon, Pa. S4	5.5	+21	+6.5	+30	+17	+38.5	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Sparrows Pt., Md. B2	5.5	+23	6.5	+32	+19	+40.5	3.25	+12	6.25	+8	9.75	+3.5	12.25	+2.75
Wheatland, Pa. W9	5.5	+21	+6	+39	+17	+38.5	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75
Youngstown R2, Y1	....	....	....	....	....	....	5.25	+10	8.25	+6	11.75	+1.5	14.25	+0.75

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Alton, Ill. L1	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	....	....	....	....
Benwood, W. Va. W10	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Etna, Pa. N2	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Fairless, Pa. N3	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Fontana, Calif. K1	1.25	+13.25	1.75	+12.75	3.25	+13	3.25	+13	+7.25	+24	+7.25	+24
Indiana Harbor, Ind. Y1	13.75	+0.75	14.25	+0.25	15.75	+0.5	15.25	+0.5	5.25	+11.5	5.25	+11.5
Lorain, O. N3	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sharon, Pa. M6	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	....	....	....	....
Sparrows Pt., Md. B2	12.75	+1.75	13.25	+1.25	14.75	+1.5	14.75	+1.5	4.25	+12.5	4.25	+12.5
Wheatland, Pa. W9	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5
Youngstown R2, Y1	14.75	0.25	15.25	0.75	16.75	0.5	16.75	0.5	6.25	+10.5	6.25	+10.5

*Galvanized pipe discounts based on current price of zinc (10.00c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.00	27.00	....	36.00	....	42.00	44.25	48.50	45.00
202	23.75	30.25	36.50	39.00	40.75	43.00	45.00	49.25	49.25
301	23.25	28.00	37.25	37.25	42.00	44.25	46.25	51.25	47.50
302	25.25	31.50	38.00	40.50	42.75	45.00	47.25	52.00	52.00
302B	25.50	32.75	40.75	45.75	45.00	47.25	49.50	57.00	57.00
303	....	32.00	41.00	....	45.50	48.00	50.00	56.75	56.75
304	27.00	33.25	40.50	44.25	45.25	47.75	50.75	55.50	55.50
304L	....	....	48.25	51.50	53.00	55.50	58.50	63.25	63.25
305	28.50	36.75	42.50	47.50	45.25	47.75	51.25	58.75	58.75
308	30.75	38.25	47.25	50.25	52.75	55.75	60.25	63.00	63.00
309	39.75	49.50	57.75	64.50	63.75	67.00	71.00	80.50	80.50
310	49.75	61.50	78.00	84.25	86.50	91.00	92.75	96.75	96.75
314	....	....	....	....	86.50	....	92.75	....	104.50
316	39.75	49.50	62.25	69.25	69.25	73.00	76.75	81.50	81.50
316L	....	....	70.00	76.50	77.00	80.75	84.50	89.25	89.25
317	48.00	60.00	76.75	85.25	86.25	90.75	93.50	101.00	101.00
321	32.25	40.00	47.00	53.50	52.50	56.50	59.75	65.50	65.50
330	....	....	118.75	....	132.00	138.50	105.50	108.00	149.25
18-8 CbTa	37.00	46.50	55.75	63.50	61.50	64.75	69.75	79.25	79.25
403	....	....	32.00	....	35.75	37.75	40.25	48.25	48.25
405	19.50	25.50	29.75	36.00	33.50	35.25	37.50	46.75	46.75
410	16.75	21.50	28.25	31.00	32.00	33.75	35.00	40.25	40.25
416	....	....	28.75	....	32.50	34.25	36.25	48.25	48.25
420	....	33.50	34.25	41.75	39.25	41.25	45.25	62.00	62.00
430	17.00	21.75	28.75	32.00	32.50	34.25	36.00	40.75	40.75
430F	....	....	29.50	....	33.00	34.75	36.75	51.75	51.75
431	....	28.75	37.75	....	42.00	44.25	46.00	56.00	56.00
446	....	....	39.25	59.00	44.25	46.50	47.75	70.00	70.00

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co., American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; G. C. Carlson Inc.; Charter Wire Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Jones & Laughlin Steel Corp.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Stainless Steel Div., Jones & Laughlin Steel Corp.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	37.50
304	34.70	37.85	42.25	46.70	40.00
304L	36.90	40.55	45.10	49.85	....
316	40.35	44.40	49.50	54.50	58.75
316L	45.05	49.35	54.70	60.10	....
316 Cb	47.30	53.80	61.45	69.10	....
321	36.60	40.05	44.60	49.30	47.25
347	38.25	42.40	47.55	52.40	57.00
405	28.60	29.85	33.35	36.85	....
410	28.15	29.55	33.10	36.70	....
430	28.30	29.80	33.55	37.25	....
Inconel	48.90	59.55	70.15	80.85	....
Nickel	41.65	51.95	62.30	72.70	....
Nickel, Low Carbon	41.95	52.60	63.30	74.15	....
Monel	43.35	53.55	63.80	74.05	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.95	40.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.305	*Cr Hot Work*	0.510
Extra Carbon	0.360	*W-Cr Hot Work*	0.500
Special Carbon	0.475	*V-Cr Hot Work*	0.475
Oil Hardening	0.475	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.285
18.25	4.25	1	4.75	....	2.500
18	4	2	9	....	2.870
18	4	2	....	....	1.960
18	4	1	....	....	1.795
9	3.5	....	....	....	1.395
13.5	4	3	....	....	2.060
13.75	3.75	2	5	....	2.440
6.4	4.5	1.9	....	5	1.300
6	4	3	....	6	1.545
1.5	4	1	....	8.5	1.155

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal transportation tax.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
AlabamaCity,Ala. R2	62.00	62.50	....	....
Birmingham R2	62.00	62.50‡	....	....
Birmingham U6	....	62.50‡	66.50	....
Woodward,Ala. W15	62.00**	62.50‡	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago,Ill. R2	66.00	....	66.50	....
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	68.62	69.12	69.12	69.62
Muskegon,Mich., deld.	....	74.12	74.12	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,O., deld.	69.12	69.62	69.62	70.12
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
New York, deld.	....	75.10	75.60	....
Newark N.J., deld.	72.29	72.79	73.29	73.79
Philadelphia, deld.	70.01	70.51	71.01	71.59
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	68.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Youngstown District				
Hubbard, O. Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	67.00
Mansfield,O., deld.	70.90	....	71.40	71.90
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Everett,Mass. E1	*67.50*	*68.00*	*68.50*	....
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	....	62.50‡	66.50	....
Toledo,O. I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.54	73.04	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
‡Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	78.00
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry. $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max fr'gt allowed up to $9. K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Troy,N.Y. R2 (Phos. 0.035% max)	74.00
Philadelphia, deld.	82.27
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	71.00

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Chattanooga, Houston, Seattle no change.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Galv. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††§		Carbon	Floor
Atlanta	8.59§	9.86§	....	....	8.64	9.01	10.68	....	9.05	8.97	10.90
Baltimore	8.28	8.88	9.76	....	8.76	9.06	11.34#	15.18	9.19	8.66	10.14
Birmingham	8.18	9.45	11.07	....	8.23	8.60	10.57	....	8.64	8.56	10.70
Boston	9.38	10.44	11.45	....	9.42	9.73	....	15.28	9.63	9.72	11.20
Buffalo	8.25	9.45	11.07	....	8.50	8.80	....	15.00	8.90	8.90	10.45
Chattanooga	8.35	9.69	9.65	....	8.40	8.77	10.46	....	8.88	8.80	10.66
Chicago	8.20	9.45	10.00	....	8.23	8.60	8.80	14.65	8.64	8.56	9.88
Cincinnati	8.34	9.48	10.05	....	8.54	8.92	9.31	14.96	9.18	8.93	10.21
Cleveland	8.18	9.45	9.95	....	8.33	8.69	....	14.74	9.01	8.79	10.11
Denver	9.38	11.75	....	....	9.41	9.78	11.10	....	9.82	9.74	11.06
Detroit	8.43	9.70	10.35	....	8.58	8.90	9.15	14.91	9.18	8.91	10.13
Erie, Pa.	8.20	9.45	9.95¹⁰	....	8.50	8.75	9.05¹⁰	....	9.00	8.85	10.10
Houston	8.45	9.75	8.45	....	8.60	9.05	11.10	....	9.10	9.05	10.30
Jackson, Miss.	8.52	9.79	....	....	8.57	8.94	10.68	....	8.97	8.90	10.74
Los Angeles	9.50	10.75	11.65	....	9.55	9.70	12.75	16.00	9.60	9.55	11.70
Milwaukee	8.33	9.58	10.13	....	8.36	8.73	9.03	14.78	8.85	8.69	10.01
Moline, Ill.	8.55	9.80	10.35	....	8.58	8.95	9.15	....	8.99	8.91	....
New York	8.87	10.13	10.56	....	9.31	9.57	....	15.09	9.35	9.43	10.71
Norfolk, Va.	8.05	....	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.00	8.90	9.87	51.94	8.67	8.65	11.51#†††	15.01	8.50	8.77	9.77**
Pittsburgh	8.18	9.45	10.35	50.00	8.33	8.60	....	14.65	8.64	8.56	9.88
Portland, Oreg.	8.50	11.20	11.55	57.20	11.35‡‡	8.65	14.65#	15.95	9.60	8.30	12.50
Richmond, Va.	8.45	....	10.40	....	9.15	9.15	....	....	9.40	8.85	10.35
St. Louis	8.54	9.79	10.36	....	8.59	8.97	9.41	15.01	9.10	8.93	10.25
St. Paul	8.79	10.04	10.61	....	8.84	9.36	9.66	....	9.38	9.30	10.49
San Francisco	9.35	10.75	11.00	54.85	9.45	9.70	13.00	16.00	9.50	9.60	12.00
Seattle	9.95	11.15	12.00	57.20	10.00	10.10	14.05	16.35	9.80	9.70	12.10
Spokane, Wash.	9.95	11.15	12.00	....	10.00	10.10	14.05	17.10	9.80	9.70	12.10
Washington	8.48	9.58	....	....	9.06	9.15	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras; ‡includes 35-cent bar quality extras; §42 in. and under; **⅛ in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.; #1 in. round C-1018; †††item quantity.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York, Boston, Seattle, Portland, Oreg. 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb, except in Portland, Oreg., 1000 to 9999 lb; ³—400 to 9999 lb; ⁸—1000 to 1999 lb; ⁹—2000 to 3999 lb; ¹⁰—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St., Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Hays, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Silica Brick (per 1000)

Clearfield, Pa., $140; Philadelphia, $137; Woodbridge, N. J., $135.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96.75; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, O., $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-41; 70%, $36.40; 60%, $33-36.50. Imported, net tons, f.o.b. cars point of entry duty paid, metallurgical grade: European, $33-34; Mexican, all-rail, duty paid, $25.25-25.75; barge, Brownsville, Tex., $27.25-27.75.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom.
Brazilian iron ore, 68-69%	30.00

Tungsten Ore

Net ton, unit, before duty

Foreign wolframite, good commercial quality	13.75-14.25
Domestic, concentrates mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.35-$1.45 per long ton unit, c.i.f. U. S. ports, duty for buyer's account: other than Indian, $1.35-$1.45; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$55.00-58.00
48% 2.8:1	52.00-55.00
48% no ratio	46.00-48.00

South African Transvaal

48% no ratio	$40.00-41.00
44% no ratio	30.00-31.00

Turkish

48% 3:1	$59.00-62.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked $1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard

55-60%	$2.90-3.30
60-65%	3.30-3.60

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, Swedish: Deld. east of Mississippi River, ocean bags 23,000 lb and over..	10.50
F.o.b. Riverton or Camden, N. J. west of Mississippi River.	9.50
Sponge Iron, Domestic, 98 + % Fe: Deld. east of Mississippi River, 23,000 lb and over	10.50
F.o.b. Riverton, N. J., west of Mississippi River	9.50
Electrolytic Iron: Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	28.00
Annealed, 99.5% Fe..	36.50
Unannealed (99 + % Fe)	36.00
Unannealed (99 + % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)..	29.00
Carbonyl Iron: 98.1-99.9%, 3 to 20 microns, depending on grade. 93.00-290.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500 lb drum, frght allowed	
Carlots	*39.50*
Ton lots	41.50
Antimony, 500 lb lots	*42.00**
Brass, 5000-lb lots	*31.30-38.40†*
Bronze, 5000-lb lots	*48.10-52.70†*
Copper: Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese: Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel unannealed ...	$1.15
Nickel-Silver, 5000-lb lots	*49.20-61.30†*
Phosphor-Copper, 5000-lb lots	*59.80*
Copper (atomized) 5000-lb lots	*40.30--48.80‡*
Silicon	47.50
Solder	7.00*
Stainless Steel, 304 ...	$1.02
Stainless Steel, 316 ...	$1.20
Tin	14.50*
Zinc, 5000-lb lots	17.50-30.70‡

Tungsten:	Dollars
Melting grade, 99% 60 to 2000 mesh:	
1000 lb and over ...	*3.15*
Less than 1000 lb ...	*3.30*
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam	Inches Length	Per 100 lb
2	24	$60.75
2½	30	39.25
3	40	37.00
4	40	35.00
5⅛	40	34.75
6	60	31.50
7	60	28.25
8, 9, 10	60	28.00
12	72	26.75
14	60	26.75
16	72	25.75
17	60	26.25
18	72	26.25
20	72	25.25
24	84	26.00

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.75
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	31.84
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, Mich., deld.	32.25
Saginaw, Mich., deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	31.84
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens.	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.24
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.85 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	29.50
Industrial xylene	32.00-34.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305...	$6.30	$6.25	$6.25	$6.50
Bar Size Angles	6.62	6.57	6.57	6.75
Structural Angles	6.62	6.57	6.57	6.75
I-Beams	6.87	6.82	6.82	7.00
Channels	6.87	6.82	6.82	7.00
Plates (basic bessemer)	8.35	8.30	8.30	8.60
Sheets, H.R.	8.25	8.20	8.20	8.50
Sheets, C.R. (drawing quality)	9.00	8.95	8.95	9.25
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	26.79	26.67	26.67	27.36
Barbed Wire (†)	6.95	6.95	6.95	7.40
Merchant Bars	6.87	6.82	6.82	7.22
Hot-Rolled Bands	7.20	7.15	7.15	7.55
Wire Rods, Thomas Commercial No. 5	6.73	6.73	6.73	7.13
Wire Rods, O.H. Cold Heading Quality No. 5	7.07	7.07	7.07	7.47
Bright Common Wire Nails (‡)	8.38	8.38	8.38	8.58

†Per 82 lb, net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, pre gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $245, Johnstown, Duquesne, Sheridan, Pa.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-90%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c, Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2%). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Managanese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 56 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Siliconmanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk 28.75c per lb of contained Cr; c.l. packed 30.30c, ton lot 32.05c; less ton 33.45c. Delivered. Spot, add 0.2oc.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload lump, bulk C 0.05% max (Simplex) 36.75c per lb contained Cr, 0.02% max 41.00c, 0.03% max 39.75c, 0.06% max 38.50c ,0.1% max 38.50c, 0.15% max 37.50c, 0.2c max 38.25c, 0.5% max 38.00c, 1.0% max 37.75c, 1.5c max 37.50c 2.0% max 37.40c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 30.05c per lb of contained Cr. Packed, c.l. 31.65c, ton 33.45c, less ton 34.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 21.25c, per lb of alloy, ton lot 22.50c; less ton lot 23.70c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 3" x down and 2" x dwon, bulk, 41.70c per lb of contained Cr; 1" x down, bulk, 42.85c. Delivered.

Chromium Metal Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract less caarload lot, packed $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 14.20c per lb of contained Si. Packed c.l. 16.70c, ton lot 18.15c, less ton 19.80c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contact, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c. ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 22.00c per lb of Si. Packed, cl. 23.65c, ton lot 24.95c, less ton 25.95c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 1% Fe grade analyzing min 99.75% Si; 0.75c for max 1.25% Fe grades analyzing min 96.75% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy; ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 2" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (1 to 2%). Contract, lump, carload 9.50c per lb f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUTTED ALLOYS

Chromium Briquets: (Weighing approx 3⅛ lb each and containing 2 lb of Cr). Contract, carload, bulk 19.60c per lb of briquet, carload packed in box pallets 19.80c, in bags 20.70c; 3000 lb to c.l. in box pallets 21.00c; 2000 lb to c.l. in bags, 21.90c; less than 2000 lb in bags 22.80c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot 2" x D, $4.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $4.30.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5.7%, Fe 20% approx). Contract, c.l. packed ¼-in x 12 M 20.00c per lb of alloy, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-3 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $110 per gross ton.

Ferromolybdenum: (55-75%). Per lb of contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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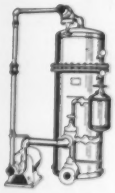

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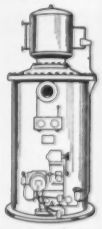

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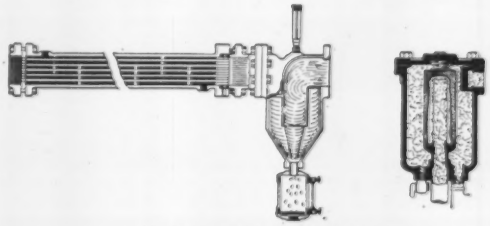

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Scrap Price Decline Unchecked

Absence of heavy mill buying exerting depressing influence on market. STEEL's composite on the prime grade falls $4.16 to $42.17, lowest since July, 1955

Scrap Prices, Page 252

Pittsburgh—Prices fell sharply last week. Several mill purchases confirmed recent reports of market weakness. Brokers paid $11 a ton below the previous price paid for No. 1 factory bundles. That drop was quickly reflected in mill purchases. One buyer got No. 1 heavy melting at a price equivalent to $43, No. 2 heavy melting at $37, and No. 2 bundles at $34. Weakness spread to other grades and resulted in declines of $7 a ton on cut structurals, boring, and turnings.

Chicago—Local scrap prices continue to skid despite light consumer buying. The drop, although ranging from $1 to $5 within a week, continues to be orderly, and there is no indication that the decline is being arrested.

Since the highs of late July and early August, No. 1 heavy industrial melting and No. 2 heavy melting have fallen $10 a ton; No. 1 dealer heavy melting, No. 2 bundles, and No. 1 railroad heavy melting, $12; No. 1 factory bundles, $13; rerolling rails, $20.

Mill inventories are good considering the present rate of steel mill operations.

Philadelphia — Heavy melting steel scrap prices continue to sag. Last week they went down on the average $2 a ton, No. 1 bundles excepted. Electric furnace bundles also are lower by $2, with prices for borings and turnings nominal.

New buying is light, and demand for export is less active. Steel scrap prices will be tested Oct. 8 when the Pennsylvania Railroad closes on 19,175 tons of ferrous scrap. Included are 4050 tons of No. 1 heavy melting railroad scrap and 3000 tons of No. 1 steel rails.

New York — Scrap prices continue to decline on light buying. Brokers' buying price for No. 1 heavy melting is $4 lower at $40-$41, shipping point. No. 2 grades are down $2 a ton. Weakness is also more pronounced in cast, notably No. 1 cupola, off $4 a ton to $39.50-$40, shipping point. Heavy breakable cast has sagged to $40-$40.50, down $3.

Boston—The scrap market continues soft here. No. 1 heavy melting is quoted at $36-$37, No. 2 heavy melting, $31-$32, No. 1 bundles, $35-$36, No. 1 busheling, $35-$36, machine shop turnings, $15-$16, mixed borings and turnings, $16-$18, short shoveling turnings, $18-$19, and No. 1 machinery cast $38-$39.

Cleveland—The market is weak. Dealer material is plentiful. Brokers are reported having difficulty disposing of industrial grades. Prices are all over the map, tending downward, but in the absence

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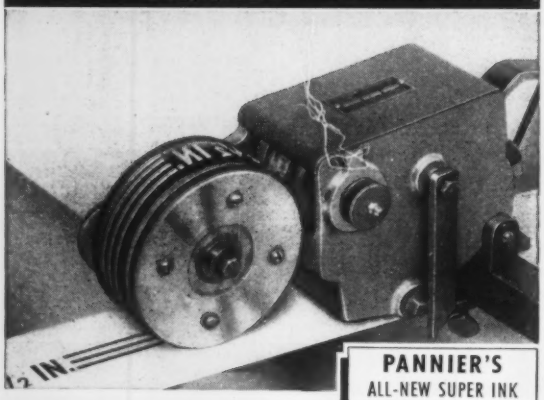

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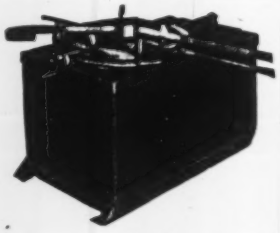
Model D-2



The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes, Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch, and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar benders.

KARDONG BROTHERS, INC.
MINNEAPOLIS 13, MINN.

T. H. LEWTHWAITE MACHINE CO., INC.
310 East 47th Street, New York 17, N. Y.

Correct clearance between the punch and die for both the *type* and *thickness* of metal being punched is essential for efficient and clean punching. Our large, planned stocks were built with this in mind.

Send for new catalog sheets on our complete line, which include charts and instructions for figuring clearances.

Using the right tools for the specific work will enable you to get the full benefit of the exceptional durability of

Lewthwaite Punches & Dies

of representative sales, the list is largely nominal. Some dealer No. 1 heavy melting is quoted at $36-$37 and No. 2 heavy melting at $30-$31. Those prices are off $3 to $4 a ton. Dealers' yard stocks are rising steadily.

Youngstown—The scrap market here is weak, and prices are declining. No representative sales are reported. The local steel mills show no disposition to get back into the scrap market, and stocks are piling up in dealers' yards.

Buffalo—Dealers are talking in terms of a $5 decline in local scrap prices. The market is weak. Dealers have been gradually lowering their buying prices in anticipation of a sharp drop in consumers' offering quotations.

Detroit — Lack of orders has pushed the local scrap market to the lowest point of the year. Some brokers feel prices may go still lower this week, though they feel most of the slump is past. Brokers offer $30-$31 for No. 1 heavy melting.

Cincinnati—Prices skidded $8 a ton here last week on the leading steelmaking grades of scrap. There is little buying support in the market. No. 1 heavy melting tumbled $8 a ton to $38-$39, brokers' buying price, one of the sharpest breaks reported. Area steel mills are well stocked, and October buying is expected to be limited. Moderate accumulations of scrap in dealers' yards are reported.

St. Louis — Buying has about stopped here. Mills are disinterested in stockpiling; foundries are confining purchases to small lots. Dealer offerings are increasing. Prices dropped $7 a ton last week.

Birmingham—Scrap prices continue to slide in this market, and brokers are predicting further declines. Most consumers are out of the market; the little buying done last week was at below their prevailing prices. Dealers appear anxious to sell their accumulations. The export market is weak.

Los Angeles—Scrap is moving at a slower pace. September sales volume was down from that in August. The weak market undertone reflects the lack of export activity.

Seattle—The scrap market here is off another $4 a ton. No. 1 heavy melting is quoted $38, No. 2 heavy melting $36, and No. 1 bundles $36, the lowest levels in months.

Washington—Domestic stocks of ferrous materials (scrap and pig iron) at the end of July totaled 9,878,000 gross tons (7,022,000 scrap and 2,856,000 pig iron), reports the U. S. Bureau of Mines. An increase of 10 per cent over the previous month's stocks, it's the largest quantity of both materials ever held by consumers. Stocks of scrap were up 8 per cent, pig iron 15 per cent.

Consumption during July totaled 4,898,000 tons of scrap and 5,559,000 tons of pig iron—a decrease of 10 per cent for scrap, 2 per cent for pig iron. The total melt (10,457,000 tons) consisted of 47 per cent scrap and 53 per cent pig iron, against 49 and 51 in June.

Iron Ore . . .

Iron Ore Prices, Page 247

Shipments of iron ore from upper lake ports totaled 2,542,987 gross tons in the week ended Sept. 30, reports the American Iron Ore Association. Comparison: 3,046,292 tons were moved in the like week a year ago.

Cumulative shipments in the lake navigation season to Sept. 30 total 69,130,944 tons, up 14,830,524 tons, compared with a movement of 54,300,420 tons in the 1956 season to Sept. 30.

Semifinished Steel . . .

Semifinished Prices, Page 241

Stocks of semifinished steel for carbon sheets, strip, bars, wire, and strip mill plates are substantial. In most cases, producers can make prompt shipments against last-minute orders. They are taking care of slightly larger volume business without any substantial increase in the primary steel production rate.

WARD STEEL CO.
We specialize in
FINISHED STEEL
BARS—TUBES—STRIP
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3042-3058 W. 51st Street, CHICAGO, ILL.
Phone Grovehill 6-2600

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Oct. 2, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Oct. 2	$42.17
Sept. 25	46.33
Sept. Avg.	47.73
Oct. 1956	57.27
Oct. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*42.00-43.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	*45.00-46.00*
No. 1 dealer bundles	*42.00-43.00*
No. 2 bundles	*33.00-34.00*
No. 1 busheling	*42.00-43.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*21.00-22.00*
Short shovel turnings	*24.00-25.00*
Cast iron borings	*24.00-25.00*
Cut structurals:	
2 ft. and under	*48.00-49.00*
3 ft lengths	*47.00-48.00*
Heavy turnings	*37.00-38.00*
Punchings & plate scrap	*47.00-48.00*
Electric furnace bundles	*47.00-48.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Stove plate	*38.00-39.00*
Unstripped motor blocks	*31.00-32.00*
Clean auto cast	*47.00-48.00*
Drop broken machinery	*56.00-57.00*

Railroad Scrap

No. 1 R.R. heavy melt.	54.00-55.00
Rails, 2 ft and under	*70.00-71.00*
Rails, 18 in. and under	*71.00-72.00*
Angles, splice bars	61.00-62.00
Rails, rerolling	70.00-71.00

Stainless Steel Scrap

18-8 bundles & solids	225.00-235.00
18-8 turnings	125.00-135.00
430 bundles & solids	80.00-85.00
430 turnings	55.00-60.00

CLEVELAND

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*32.00-33.00*
No. 1 factory bundles	*39.00-40.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	15.00-16.00
Short shovel turnings	19.00-20.00
Mixed borings, turnings	19.00-20.00
Cast iron borings	19.00-20.00
Cut foundry steel	*43.00-44.00*
Cut structurals, plates 2 ft and under	*47.00-48.00*
Low phos. punchings & plate	*39.00-40.00*
Alloy free, short shovel turnings	24.00-25.00
Electric furnace bundles	*39.00-40.00*

Cast Iron Grades

No. 1 cupola	*45.00-46.00*
Charging box cast	37.00-38.00
Heavy breakable cast	35.00-36.00
Stove plate	44.00-45.00
Unstripped motor blocks	31.00-32.00
Brake shoes	35.00-36.00
Clean auto cast	48.00-49.00
Burnt cast	33.00-34.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00-43.00*
R.R. malleable	*55.00-56.00*
Rails, 2 ft and under	*65.00-66.00*
Rails, 18 in. and under	*66.00-67.00*
Rails, random lengths	59.00-60.00
Cast steel	57.00-58.00
Railroad specialties	*57.00-58.00*
Uncut tires	*52.00-53.00*
Angles, splice bars	*55.00-56.00*
Rails, rerolling	64.00-65.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	*215.00-220.00*
18-8 turnings	*115.00-120.00*
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*40.00-41.00*
Machine shop turnings	16.00-17.00
Short shovel turnings	*20.00-21.00*
Cast iron borings	*20.00-21.00*
Low phos.	*43.00-44.00*
Electric furnace bundles	*43.00-44.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*44.00-45.00*

CHICAGO

No. 1 heavy melt., indus.	*45.00-46.00*
No. 1 hvy melt., dealer	*40.00-41.00*
No. 2 heavy melting	*36.00-37.00*
No. 1 factory bundles	*46.00-47.00*
No. 1 dealer bundles	*41.00-42.00*
No. 2 bundles	*26.00-30.00*
No. 1 busheling, indus.	*45.00--46.00*
No. 1 busheling dealer	*40.00-41.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Cut structurals, 3 ft.	*47.00-48.00*
Punchings & plate scrap	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Stove plate	*38.00-39.00*
Unstripped motor blocks	*32.00-33.00*
Clean auto cast	*45.00-46.00*
Drop broken machinery	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*47.00-48.00*
R.R. malleable	*54.00-55.00*
Rails, 2 ft and under	*58.00-59.00*
Rails, 18 in. and under	*59.00-60.00*
Angles, splice bars	*54.00-55.00*
Axles	*59.00-60.00*
Rails, rerolling	*59.00-60.00*

Stainless Steel Scrap

18-8 bundles & solids	215.00-225.00
18-8 turnings	115.00-125.00
430 bundles & solids	80.00-90.00
430 turnings	*50.00-55.00*

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*30.00-31.00*
No. 2 heavy melting	*26.00-27.00*
No. 1 bundles	*31.00-32.00*
No. 2 bundles	24.00-25.00
No. 1 busheling	*30.00-31.00*
Machine shop turnings	*16.00-17.00*
Mixed borings, turnings	*17.00-18.00*
Short shovel turnings	19.00-20.00
Punchings & plate scrap	*43.00-44.00*

Cast Iron Grades

No. 1 cupola	44.00
Stove plate	*39.00*
Charging box cast	*38.00*
Heavy breakable	*38.00*
Unstripped motor blocks	*25.00*
Clean auto cast	*46.00*
Malleable	*45.00†*

†Nominal

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	*43.00*
No. 2 heavy melting	*41.00*
No. 1 bundles	*43.00*
No. 2 bundles	*35.00*
No. 1 busheling	*43.00*
Machine shop turnings	*23.00*
Short shovel turnings	*25.00*

Cast Iron Grades

No. 1 cupola	*45.00*
Charging box cast	*40.00*
Heavy breakable cast	*40.00*
Unstripped motor blocks	*40.00*
Brake shoes	40.00
Clean auto cast	*46.00*
Stove plate	*42.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*48.00*
Rails, 18 in. and under	69.00
Rails, random lengths	*58.00*
Rails, rerolling	*66.00*
Angles, splice bars	59.00

PHILADELPHIA

No. 1 heavy melting	*41.00*
No. 2 heavy melting	*37.00*
No. 1 bundles	46.00
No. 2 bundles	*32.00*
No. 1 busheling	*45.00*
Electric furnace bundles	*47.00*
Mixed borings, turnings	*26.00*
Short shovel turnings	*28.00*
Machine shop turnings	*24.00*
Heavy turnings	*37.00*
Structural & plate	*47.00-49.00*
Couplers, springs, wheels	63.50
Rail crops, 2 ft & under	69.00-71.00

Cast Iron Grades

No. 1 cupola	*43.00*
Heavy breakable cast	*47.00*
Malleable	61.00
Drop broken machinery	56.00-57.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*40.00-41.00*
No. 2 heavy melting	*35.00-36.00*
No. 1 bundles	*40.00-41.00*
No. 2 bundles	*28.00-29.00*
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*15.00-16.00*
Short shovel turnings	*16.00-17.00*
Low phos. (structural & plate	48.00-49.00

Cast Iron Grades

No. 1 cupola	*39.00-40.00*
Unstripped motor blocks	*35.00-36.00*
Heavy breakable	*40.00-40.50*

Stainless Steel

18-8, sheets, clips, solids	190.00-200.00
18-8 borings, turnings	90.00-100.00
430 sheets, clips, solids	65.00-75.00
410 sheets, clips, solids	50.00-55.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*35.00-36.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 bundles	*35.00-36.00*
No. 2 bundles	29.00-30.00
No. 1 busheling	*35.00-36.00*
Machine shop turnings	*15.00-16.00*
Mixed borings, turnings	*16.00-18.00*
Short shovel turnings	*18.00-19.00*
No. 1 cast	33.00-34.00
Mixed cupola cast	32.00-33.00
No. 1 machinery cast	*38.00-39.00*

BUFFALO

No. 1 heavy melting	*41.00-42.00*
No. 2 heavy melting	*34.50-35.50*
No. 1 bundles	*41.00-42.00*
No. 2 bundles	*31.50-32.50*
No. 1 busheling	*41.00-42.00*
Mixed borings, turnings	*25.00-26.00*
Machine shop turnings	*23.00-24.00*
Short shovel turnings	*26.00-27.00*
Cast iron borings	*25.00-26.00*
Low phos.	*45.00-46.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	46.00-47.00
No. 1 machinery	51.00-52.00

Railroad Scrap

Rails, random lengths	*55.00-56.00*
Rails, 3 ft and under	*60.00-61.00*
Railroad specialties	*53.00-54.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*29.00-30.00*
No. 1 busheling	*38.00-39.00*
Machine shop turnings	*21.00-22.00*
Mixed borings, turnings	*22.00-23.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*22.00-23.00*
Low phos. 18 in.	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*40.00-41.00*
Heavy breakable cast	*35.00-36.00*
Charging box cast	*35.00-36.00*
Drop broken machinery	*50.00-51.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*42.00-43.00*
Rails, 18 in. and under	*67.00-68.00*
Rails, random lengths	*57.00-58.00*

BIRMINGHAM

No. 1 heavy melting	*38.00-39.00*
No. 2 heavy melting	*34.00-35.00*
No. 1 bundles	*38.00-39.00*
No. 2 bundles	*24.00-25.00*
No. 1 busheling	*38.00-39.00*
Cast iron borings	*25.00-26.00*
Short shovel turnings	*31.00-32.00*
Machine shop turnings	*29.00-30.00*
Bar crops and plates	*44.00-45.00*
Structurals & plate	*44.00-45.00*
Electric furnace bundles	*43.00-44.00*
Electric furnace:	
3 ft and under	*41.00-42.00*
2 ft and under	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Stove plate	*51.00-52.00*
Unstripped motor blocks	*39.00-40.00*
Charging box cast	*27.00-28.00*
No. 1 wheels	*40.00-41.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*43.00-44.00*
Rails, 18 in. and under	*54.00-55.00*
Rails, rerolling	*61.00-62.00*
Rails, random lenghts	*47.00-48.00*
Angles, splice bars	*52.00-53.00*

SEATTLE

No. 1 heavy melting	*37.00*
No. 1 bundles	*36.00*
No. 2 heavy melting	*36.00*
No. 2 bundles	25.00
Machine shop turnings	27.00†
Mixed borings, turnings	27.00†
Electric furnace No. 1	40.00†

Cast Iron Grades

No. 1 cupola	38.00
Heavy breakable cast	35.00
Unstripped motor blocks	30.50
Stove plate (f.o.b. plant)	28.00

†Nominal

LOS ANGELES

No. 1 heavy melting	46.00
No. 2 heavy melting	44.00
No. 1 bundles	45.00
No. 2 bundles	35.00
Machine shop turnings	35.00
Shoveling turnings	32.00
Cast iron borings	31.00
Cut structural and plate, 1 ft and under	60.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	52.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00

SAN FRANCISCO

No. 1 heavy melting	44.00
No. 2 heavy melting	42.00
No. 1 bundles	43.00
No. 2 bundles	35.00
Machine shop turnings	30.00
Mixed borings, turnings	30.00
Cast iron borings	30.00
Heavy turnings	30.00
Short shovel turnings	30.00
Cut structurals, 3 ft.	50.00

Cast Iron Grades

No. 1 cupola	52.00
Charging box cast	45.00
Stove plate	46.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Clean auto cast	52.00
No. 1 wheels	45.00
Drop broken machinery	52.00

HAMILTON, ONT.

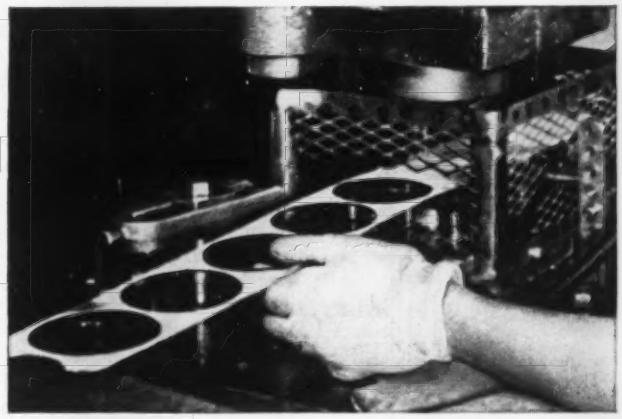
No. 1 heavy melting	47.00
No. 2 heavy melting	42.00
No. 1 bundles	47.00
No. 2 bundles	36.00
Mixed steel scrap	42.00
Mixed borings, turnings	24.00
Busheling, new factory: Prepared	47.00
Unprepared	41.00
Short steel turnings	30.00
Rails, rerolling	61.00

Cast Iron Grades†

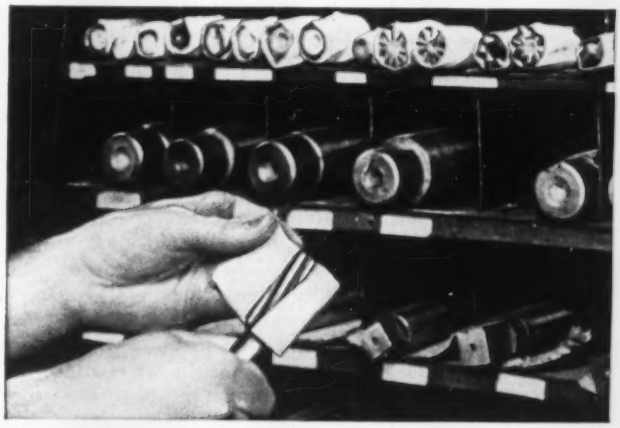
No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.

LOW-COST TAPE for that "EXTRA OUNCE OF PREVENTION"



Low-cost tape aids fabrication work. No rejections due to scratches or rough fragments left on stainless steel by this punch-press operation, thanks to the superior cushioning and abrasion-resistance of low-cost Polyken Tape No. 113. Speedy, clean removal.



Low-cost tape guards tools in storage. Polyken Tape No. 133 provides a durable cloth backing for sharp cutting edges . . . yet it pulls off clean and quick when the tools are ready for use.

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Good Year for Diecastings

Aluminum shipments to diecasters will top 1956's; zinc will about hold last year's pace. Some see Tariff Commission doubling lead and zinc duties. Copper market unchanged

Nonferrous Metal Prices, Pages 256 & 257

DIECASTINGS may well be the silver lining in the cloudy business picture for aluminum and zinc. Aluminum diecasting shipments this year will best 1956's total. Diecasters will probably take about as much zinc as they did last year, even though requirements of other customers are down.

Aluminum — Diecasting uses have been advancing steadily: 118,000 tons were shipped in 1953; the figure will climb to around 192,500 tons this year (see chart). Producers expect another record in 1958.

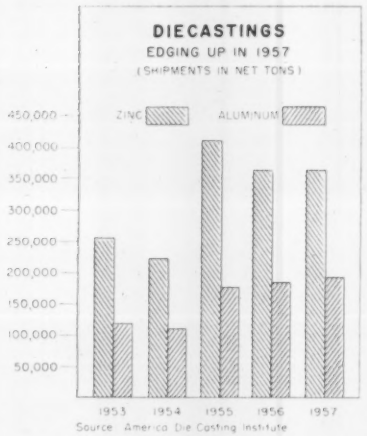
Partially responsible for aluminum's surge are: 1. Advances in handling and casting. 2. Installation of automatic processes to increase operating speeds (improved lubricants and lubricators, new temperature control systems, more durable cores). 3. Development of larger diecasting machines.

Biggest uses for aluminum diecastings are in automobiles (35 per cent of shipments), home appliances (21 per cent), industrial machines and tools (16 per cent), and office equipment (7.5 per cent).

An added bonus: The most common grades of zinc diecastings contain about 4 per cent aluminum. This alone will amount to approximately 14,500 tons of aluminum in 1957, says the American Die Casting Institute, New York.

Zinc—Producers are particularly pleased with diecasting sales because autos haven't done as well as expected; home appliances are down; and price fluctuations have made the market unstable.

Better things are predicted. Next year will be second only to 1955 when 410,000 tons of zinc diecastings were produced. A peak was hit in 1955 because Detroit turned out 8 million cars. But even if auto production were to remain static, zinc diecasting shipments probably would rise. An average of 68.7 lb of diecastings was used in each 1955 automobile. The figure climbed to 71.3 lb in 1956 and 77 lb in 1957.



Tariff Hearing Asked

The Emergency Lead, Zinc Committee has asked the U. S. Tariff Commission for an early hearing on establishing new import duties on both metals. But don't look for any action until 1958. It will take that long for the commission to get the mining industry's recommendations, hold hearings, and obtain presidential approval.

Some observers predict the commission will double the present tariff. It's now 1.0625 cents a pound for lead and 0.7 cent a pound for zinc.

The government continues to take substantial tonnages of both metals for long range stockpile. A survey of primary producers indicates that September takes of lead and zinc for October delivery ran 3 to 5 per cent over those of the previous month.

Copper: Still Dull

The copper market continues to plod along without gaining any sales momentum. But there haven't been any setbacks. Both primary at 27 cents a pound and custom smelted at 26 cents appear stable.

Producers say foreign sales remain good but that domestic users still buy hand to mouth. It's felt more strongly than ever before that many customers have reduced stocks almost to the zero point.

Shipments of brass and bronze ingots were 19,654 tons in August, the best month since May when they hit 22,037 tons. Shipments in the first eight months of 1957 were 169,179 tons, compared with 190,258 tons in the year-ago period.

Overproduction still remains copper's number one problem, but there are signs that it is easing. Two recent developments: 1. Striking miners have shut down Copper Range Co.'s 50,000 ton a year White Pine Mine in Michigan. 2. Kennecott Copper Corp.'s Ray Mines Div. will be down for two weeks this month for repairs. The facility produces about 4500 tons of copper a month.

NONFERROUS PRICE RECORD

	Price Oct. 2	Last Change		Previous Price	Sept. Avg	Aug. Avg	Oct., 1956 Avg
Aluminum ..	28.10	Aug.	1, 1957	27.10	27.100	27.100	27.100
Copper	26.00–27.00	Sept.	12, 1957	25.50–27.00	26.469	28.639	38.365
Lead	13.80	June	11, 1957	14.80	13.800	13.800	15.800
Magnesium .	35.25	Aug.	13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec.	6, 1956	64.50	74.000	74.000	64.500
Tin	93.00	Oct.	1, 1957	93.25	93.422	94.259	105.981
Zinc	10.00	July	1, 1957	10.50	10.000	10.000	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

You get speedier service from the

ZINC ZONE

Central location of American Zinc plants assures prompt deliveries of slab zinc to any point in the nation.

HILLSBORO, ILL., PLANT
Prime Western, Brass Special, Intermediate, High Grade, Continuous Galvanizing Grades
MONSANTO, ILL., ELECTROLYTIC PLANT
Special High Grade, High Grade, Continuous Galvanizing Grades, Special Shapes
FORT SMITH, ARK., SMELTER
Prime Western, Brass Special
DUMAS, TEXAS, SMELTER
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AGRICULTURAL LIMESTONE
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American Zinc Sales Company

Distributors for AMERICAN ZINC, LEAD & SMELTING COMPANY

Columbus, Ohio • Chicago • St. Louis • New York • Detroit • Pittsburgh

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 28.10, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 29.90; No. 43, 29.70; No. 195, 31.30; No. 241, 31.50; No. 356, 29.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.00 per lb for 550-lb keg; $2.02 per lb for 100-lb case; $2.07 per lb under 100 lb.

Columbium: Powder, $120 per lb, nom.

Copper: Electrolytic, 27.00 deld.; custom smelters, 26.00; lake, 27.00 deld; fire refined, 26.75 deld.

Germanium: First reduction, $179.17-197.31 per lb; intrinsic grade, $197.31-220 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $86-110 nom. per troy oz.

Lead: Common, 13.80; chemical, 13.90; corroding, 13.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex.; 12 in. sticks, 59.00 f.o.b. Madison, Ill.

Magnesium Alloys: AZ91A (diecasting), 40.75 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $243-245 per 76-lb flask.

Molybdenum: Unalloyed, turned extrusions, 3.75-5.75 in. round, $9.60 per lb in lots of 2500 lb or more, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, 74.50; "F" nickel 5 lb ingots in kegs for addition to cast iron, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter, 71.25 per lb of nickel content before 1 cent freight allowance, f.o.b. Copper Cliff, Ont.

Osmium: $80-100 per troy oz, nom.

Palladium: $21-24 per troy oz.

Platinum: $81-87 per troy oz from refineries.
Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $118-125 per troy oz.

Ruthenium: $45-55 per troy oz.

Selenium: $10.50 per lb, commercial grade.

Silver: Open market, 90.625 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l.

Tantalum: Rod, $60 per lb; sheet, $55 per lb.

Tellurium: $1.65-1.85 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 93.00; prompt, 92.875.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.25; grade A-2 (0.5% Fe max.), $2.00 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $3.50 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.10-4.20.

Zinc: Prime Western, 10.00; brass special, 10.25; intermediate, 10.50, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 11.35; special high grade, 11.75 deld. Die casting alloy ingot No. 3, 14.25; No. 2, 15.25; No. 5, 14.75 deld.

Zirconium: Sponge, commercial grade, $5-10 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.75-30.25; No. 12 foundry alloy (No. 2 grade), 21.75-23.00; 5% silicon alloy, 0.60 Cu max., 25.50-26.00; 13 alloy, 0.60 Cu max., 25.50-26.00; 195 alloy, 24.75-26.75; 108 alloy, 22.25-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 23.75; grade 2, 22.00; grade 3, 20.75; grade 4, 19.00.

Brass Ingot: Red brass, No. 115, 27.75; tin bronze, No. 225, 37.00; No. 245, 31.25; high-leaded tin bronze, No. 305, 31.75; No. 1 yellow, No. 405, 22.50; manganese bronze, No. 421, 25.50.

Magnesium Alloy Ingot: AZ63A, 40.75; AZ91B, 37.25; AZ91C, 40.75; AZ92A, 40.75.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.82, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 32.355; l.c.l., 32.98. Weatherproof, 30,000-lb lots, 33.66; l.c.l., 34.78. Magnet wire deld., 40.43, before quantity discounts.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $19.50 per cwt; pipe, full coils, $19.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $9.50-15.95; sheared mill plate, $8.00-11.50; wire, $7.50-11.50; forging billets, $6.00-7.60; hot-rolled and forged bars, $6.15-7.90.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 20.50; plates, 19.00.

ZIRCONIUM

Plate, $12.50-19.20; H.R. strip, $12.50-22.90; C.R. strip, $15.00-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheets: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range Inches	Flat Sheet	Coiled Sheet
0.249-0.136	43.10-47.60	....
0.135-0.096	43.60-48.70	40.50-41.10
0.095-0.077	44.30-50.50	40.60-41.30
0.076-0.061	44.90-52.80	40.80-42.00
0.060-0.048	45.60-55.10	41.40-43.10
0.047-0.038	46.20-57.90	41.90-44.50
0.037-0.030	46.60-62.90	42.30-46.30
0.029-0.024	47.20-54.70	42.60-47.00
0.023-0.019	48.20-58.10	43.70-45.40
0.018-0.017	49.00-55.40	44.30-46.00
0.016-0.015	49.90-56.30	45.10-46.80
0.014	50.90	46.10-47.80
0.013-0.012	52.10	46.80
0.011	53.10	48.00
0.010-0.0095	54.60	49.40
0.009-0.0085	55.90	50.90
0.008-0.0075	57.50	52.10
0.007	59.00	53.60
0.006	60.60	55.00

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	42.70	47.50
5050-F	43.80	48.60
3004-F	44.80	50.50
5052-F	45.40	51.20
6061-T6	46.90	53.00
2024-T4*	50.60	57.40
7075-T6*	58.40	66.00

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in. or across flats	—Round— 2011-T3	2017-T4	—Hexagonal— 2011-T3	2017-T4
Drawn				
0.125	78.20	75.20	....	....
0.156-0.172	66.20	63.10	....	....
0.188	66.20	63.10	....	81.60
0.219-0.234	63.00	61.50	....	....
0.250-0.281	63.00	61.50	....	77.90
0.313	63.00	61.50	....	74.20
0.344	62.50	....	....	....
Cold-Finished				
0.375-0.517	62.50	61.30	74.80	69.80
0.563-0.688	62.50	61.30	71.10	65.50
0.719-1.000	61.00	59.70	64.90	61.70
1.063	61.00	59.70	....	59.60
1.125-1.500	58.60	57.40	62.80	59.60
Rolled				
1.563	57.00	55.70	....	....
1.625-2.000	56.30	54.90	....	57.50
2.125-2.500	54.80	53.40	....	....
2.563-3.375	53.20	51.70	....	....

Forging Stock: Round, Class 1, 45.20-58.60 in specific lengths, 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 50.50-66.60 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅜	$19.40	2	$ 59.90
1	30.50	4	165.05
1¼	41.30	6	296.10
1½	49.40	8	445.55

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.40-47.00	60.60-64.80
12-14	45.70-47.20	61.30-65.80
15-17	45.90-47.90	62.50-67.50
18-20	46.50-48.30	64.50-70.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Thread plate, .188 in., 71.70; .250-2.00 in., 70.60. Tooling plates, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)
Aluminum: 1100 clippings, 13.50-14.00; old sheets, 10.50-11.00; borings and turnings, 6.50-

BRASS MILL PRICES

MILL PRODUCTS [a]

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes
Copper	49.13b	46.36c	....	49.32
Yellow Brass	43.02	31.30d	43.56	45.93
Low Brass, 80%	45.50	45.44	46.04	48.31
Red Brass, 85%	46.37	46.31	46.91	49.18
Com. Bronze, 90%	47.78	47.72	48.32	50.34
Manganese Bronze	51.01	45.11	55.61	....
Muntz Metal	45.39	41.20	....	....
Naval Brass	47.27	41.58	54.33	50.68
Silicon Bronze	53.76	52.95	53.80	55.74e
Nickel Silver, 10%	59.43	61.75	61.75	....
Phos. Bronze, A-5%	68.07	68.57	68.57	69.75

SCRAP ALLOWANCES [f]

	Clean Heavy	Rod Ends	Clean Turnings
Copper	23.000	23.000	22.250
Yellow Brass	17.375	17.125	15.750
Low Brass, 80%	19.500	19.250	18.750
Red Brass, 85%	20.250	20.000	19.500
Com. Bronze, 90%	21.000	20.750	20.250
Manganese Bronze	16.125	15.875	15.375
Muntz Metal	16.375	16.125	15.625
Naval Brass	16.125	15.875	15.375
Silicon Bronze	22.625	22.375	21.625
Nickel Silver, 10%	23.625	23.375	11.813
Phos. Bronze, A-5%	23.750	23.500	22.500

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

7.00; crankcases, 10.50-11.00; industrial castings, 10.50-11.50.

Copper and Brass: No. 1 heavy copper and wire, 18.25-18.75; No. 2 heavy copper and wire, 16.75-17.25; light copper, 14.75-15.25; No. 1 composition red brass, 16.50-17.00; No. 1 composition turnings, 16.00-16.50; new brass clippings, 14.00-14.50; light brass, 10.00-10.50; heavy yellow brass, 12.00-12.50; new brass rod ends, 13.00-13.50; auto radiators, unsweated, 12.50-13.00; cocks and faucets, 13.00-13.50; brass pipe, 13.50-14.00.

Lead: Heavy 9.50-10.00; battery plates, 4.25-4.50; linotype and stereotype, 11.50-12.00; electrotype, 10.00-10.50; mixed babbitt, 11.00-11.50.

Monel: Clippings, 35.00-37.00; old sheets, 33.00-35.00; turnings, 24.00-25.00; rods, 35.00-37.00.

Nickel: Sheets and clips, 50.00-55.00; rolled anodes, 50.00-55.00; turnings, 45.00-50.00; rod ends, 50.00-55.00.

Zinc: Old zinc 3.00-3.25; new diecast scrap, 2.75-3.00; old diecast scrap, 1.50-1.75.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.00-17.50; 5052 clippings, 16.00-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.00-13.50; old cast, 13.00-13.50; clean old cable (free of steel), 16.00-16.50; borings and turnings, 13.50-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 53.00; light scrap, 48.00; turnings and borings, 33.00.

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 20.00; light copper, 17.75; refinery brass (60% copper) per dry copper content, 19.25.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 21.50; No. 2 heavy copper and wire, 20.00; light copper, 17.75; No. 1 composition borings, 18.50; No. 1 composition solids, 19.00; heavy yellow brass solids, 13.50; yellow brass turnings, 12.50; radiators, 15.50.

PLATING MATERIALS

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 45.29; oval, 43.50, 5000-10,000 lb; electrodeposited, 35.75, 2000-5000 lb lots; cast, 36.25, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 111.50; 200-499 lb, 110.00; 500-999 lb, 109.50; 1000 lb or more, 109.00.

Zinc: Balls, 17.50; flat tops, 17.50; flats, 19.25; ovals, 18.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb in 100-lb drums.

Chromic Acid: 100 lb, 33.30; 500 lb, 32.80; 2000 lb, 32.15; 5000 lb, 31.80; 10,000 lb, 31.30, f.o.b. Detroit.

Copper Cyanide: 100-200 lb, 74.80; 300-900 lb, 72.80.

Copper Sulphate: 100-1900 lb, 14.55; 2000-5900 lb, 12.55; 6000-11,900 lb, 12.30; 12,000-22,900 lb, 12.05; 23,000 lb or more, 11.55.

Nickel Chloride: Less than 400 lb, 35.00; 400-9990 lb, 33.00; 10,000 lb, 32.50.

Nickel Sulphate: 5000-22,000 lb, 33.50; 23,000-35,900 lb, 33.00; 36,000 lb or more, 32.50.

Sodium Cyanide: 100 lb, 27.60; 200 lb, 25.90; 400 lb, 22.90; 1000 lb, 21.90; f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 74.70; 100-600 lb, 65.80; 700-1900 lb, 63.00; 200-9900 lb, 61.20; 10,000 lb or more, 59.80.

Stannous Chloride (anhydrous): Less than 25 lb, 164.10; 25 lb, 129.10; 100 lb, 114.10; 400 lb, 111.60; 5200-19,600 lb, 99.40; 20,000 lb or more, 87.20.

Stannous Sulphate: Less than 50 lb, 126.90; 50 lb, 96.90; 100-1900 lb, 94.90; 2000 lb or more, 92.90.

Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

Galvanizing Worries?

End Them by Contacting—

National Galvanizing Company

Who will:

1. Do your galvanizing for you in the world's most modern and efficient galvanizing plant (which we would like you to consider your own private galvanizing department).

OR

2. Build and operate complete job galvanizing facilities in your city.

OR

3. Engineer and install modern, low-cost facilities to replace outmoded galvanizing operations.

NATIONAL GALVANIZING COMPANY
4000 Grand Avenue
Pittsburgh 25, Pa.

Galvanizing facilities to process 200 tons of job work per day

WANTED

Superintendent for large ore crushing, screening and sintering operation in Great Lakes district. Should have heavy operating and maintenance experience. Salary open.

Reply Box 588, STEEL
Penton Bldg. Cleveland 13, Ohio

CLASSIFIED

Help Wanted

FOUNDRY SUPERINTENDENT for jobbing foundry in New England producing carbon, low alloy and stainless castings. Must have practical and technical background, be cost minded and be able to assume responsibility. In reply include complete resume giving experience, background, availability, age, salary expected, etc. Reply to Box 594, STEEL, Penton Bldg., Cleveland 13, Ohio.

METALLURGISTS: Steel company located in northeastern Ohio has several openings for metallurgical graduates interested in titanium research and production control. Send resume to Box 600, STEEL, Penton Bldg., Cleveland 13, Ohio.

STEEL CASTING SALES ENGINEER
Challenging opportunity for experienced salesman. Practical foundry and technical background required. Location Northeast. Age range 35 to 45. Salary plus commission, plus expenses. Reply with complete resume to Box 592, STEEL, Penton Bldg., Cleveland 13, Ohio.

Positions Wanted

MECHANICAL ENGINEER, 43, graduate, 20 yrs. experience plant engineering, forward planning, design, specifications, new construction in seamless and welded tube mills and related plant facilities. Desires to relocate as dept. head or administrative assistant. Midwest or far west preferred. Appropriate responses acknowledged. Reply Box 602, STEEL, Penton Bldg., Cleveland 13, Ohio.

METALLURGIST, B. S. degree, age 31, 6½ years manufacturing and engineering experience with accessories, farm equipment and aircraft manufacturers, desires to become associated with progressive manufacturer. Education, experiences, and interests lie with material selection and its processing, with emphasis on steel application, heat treatment, and electroplating and other surface protection. Write Box 599, STEEL, Penton Bldg., Cleveland 13, Ohio.

FOR SALE

Ajax—Salt Bath Annealing Furnace, 222" x 24" x 47" complete with automatic Conveyor; 2 cold-water wash tanks and rubber lined pickling tank 60" x 30" x 48", including all heat resisting fixtures, electrodes, pumps, pipe, fittings, wiring, transformers and heaters. Cost Government in 1953 over $175,000.00.

Available immediately at a sacrifice.

EDWARD LEVY METALS, INC.
BOX 1086
NEW ORLEANS, LA.

PHONE: MAGNOLIA 3777

FOR SALE

Sodium Hydride Descaling Equipment

Descaling tank, working area 56" x 18" x 18", gas fired immersion heaters, Brown recording controller. Ammonia dissociator with vaporizer, indicating temperature controller. Acid tank 3' x 6' x 3' brick lined, graphite plate heater. Used less than 1 year for experimental production.

CHERRY-BURRELL CORPORATION
Little Falls, N. Y.

FOR SALE

STRUCTURAL STEEL FABRICATING BUSINESS. 3000 ton annual capacity, in rapidly expanding California area. Only $100,000 including land, buildings, machinery. Might lease to responsible parties. Seller can supply approximately 1,000 ton annual business. Box No. 598, STEEL, Penton Bldg., Cleveland 13, Ohio.

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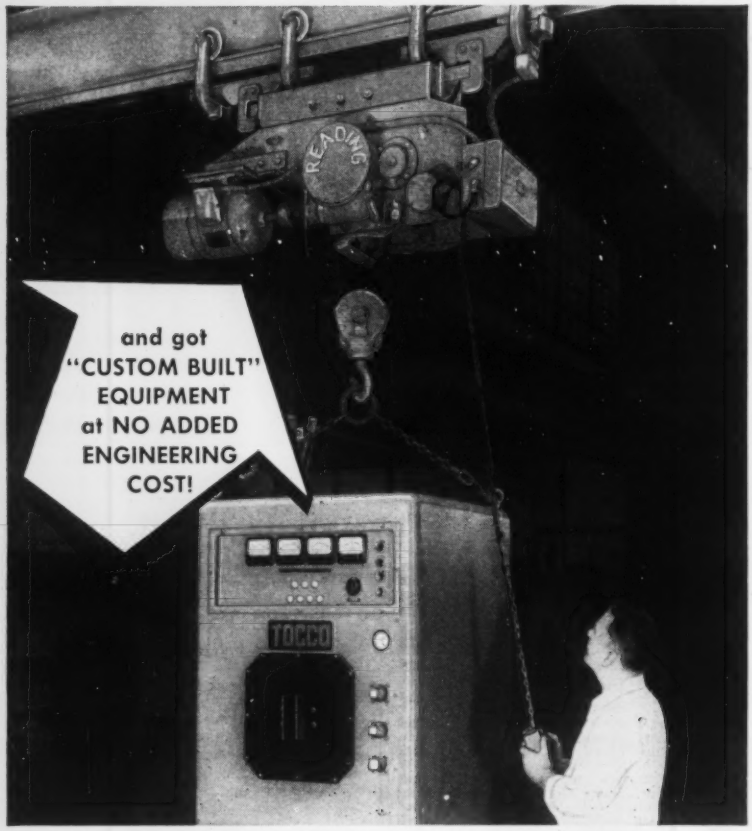
By checking the classified pages of STEEL each week you'll be able to find many different types of equipment which will fit your requirements. Used or surplus equipment—you can best find it in STEEL's classified columns.

TOCCO Chose Reading Electric Hoists ...



This Reading electric hoist is moving a sheet metal cabinet from a heating station to the production line. All Reading hoists at Tocco have the same two-button pendant control.

● Rapidly rising production goals are being met in Ohio Crankshaft's new Tocco Division plant in Cleveland's South Side . . . thanks partly to Reading Electric Hoists.

Tocco, a leading producer of induction heating equipment, designed the new plant to meet the needs of its rapid expansion. Pre-planned materials handling, involving trucks, bridge cranes and electric hoists, is paying off in fast, orderly movement of materials from operation to operation.

Playing a big role in this integrated handling system is a series of Reading electric hoists, "custom-built" from standard Reading units to meet the exact requirements of each operation. These hoists permit Tocco workmen to move all material without manual lifting.

Reading's unique "Unit Construction" plan offers you special equipment for your own plant at the low cost of standard parts. Investigate now this proven way to get faster, better materials handling. A note on your company letterhead will bring a Reading engineer to analyze your handling operations . . . at no obligation.

Reading Crane & Hoist Corporation, 2103 Adams St., Reading, Pa.

READING HOISTS

CHAIN HOISTS — OVERHEAD TRAVELING CRANES — ELECTRIC HOISTS

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there's so much to choose from at...

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Dine in the splendid old world setting of a grand dining room. The menu is varied, the service unexcelled.

Bronze Room

One of the brightest of the city's supper clubs. Dancing nightly from 9:00 p.m. Air conditioned, of course.

Rib Room

A true specialty restaurant For Fabulous Roast Beef, roasted, carved and served to your order.

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For rapid service in the most unique bar in the country . . decorated with an outstanding collection of miniature trains.

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Pause — in the relaxing, informal atmosphere of the gayly decorated Patio. It's a Cleveland habit to say — "Meet me at the Patio."

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Service is brisk and decor cheerful in the modern, air-conditioned coffee shop. Enjoy a tasty sandwich or a moderately priced meal.

Hotel Cleveland

CLEVELAND, OHIO

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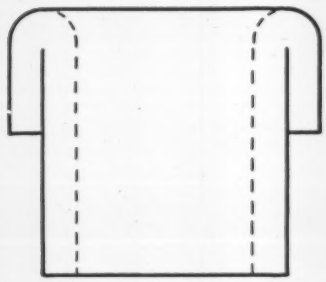
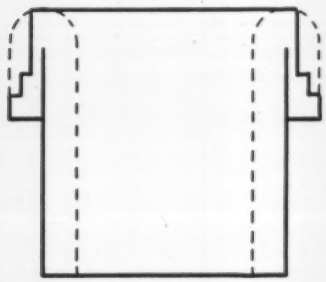
more proof of *Carpenter* quality . . . at no extra cost



Reverse bend is made on one end, doubling the pipe back on itself.



Machining is then performed on the doubled back part of the pipe as shown in photo.

Carpenter Stainless Pipe shows fabrication savings!

Only the highest quality stainless pipe and tubing with outstanding uniformity in properties and dimensions can take this punishing reverse bend (see sketches) and succeeding machining operations. The part is made from 2″ Carpenter Schedule 40 pipe, and must meet close tolerance requirements consistently.

If more of this kind of proof is needed, call your nearest Carpenter Distributor today. He has the service and stock to serve you right!

MEMBER

The Carpenter Steel Company
Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

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STOP-HOLD—Master Type M Magnetic Unibrake Motors. For quick, controlled stopping—especially when you want to hold the load. Spring-setting magnetic release brakes of the friction disc type combine with motor in a compact, integral unit. Sizes—⅛ to 150 H.P.

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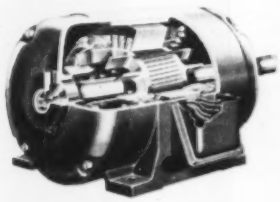
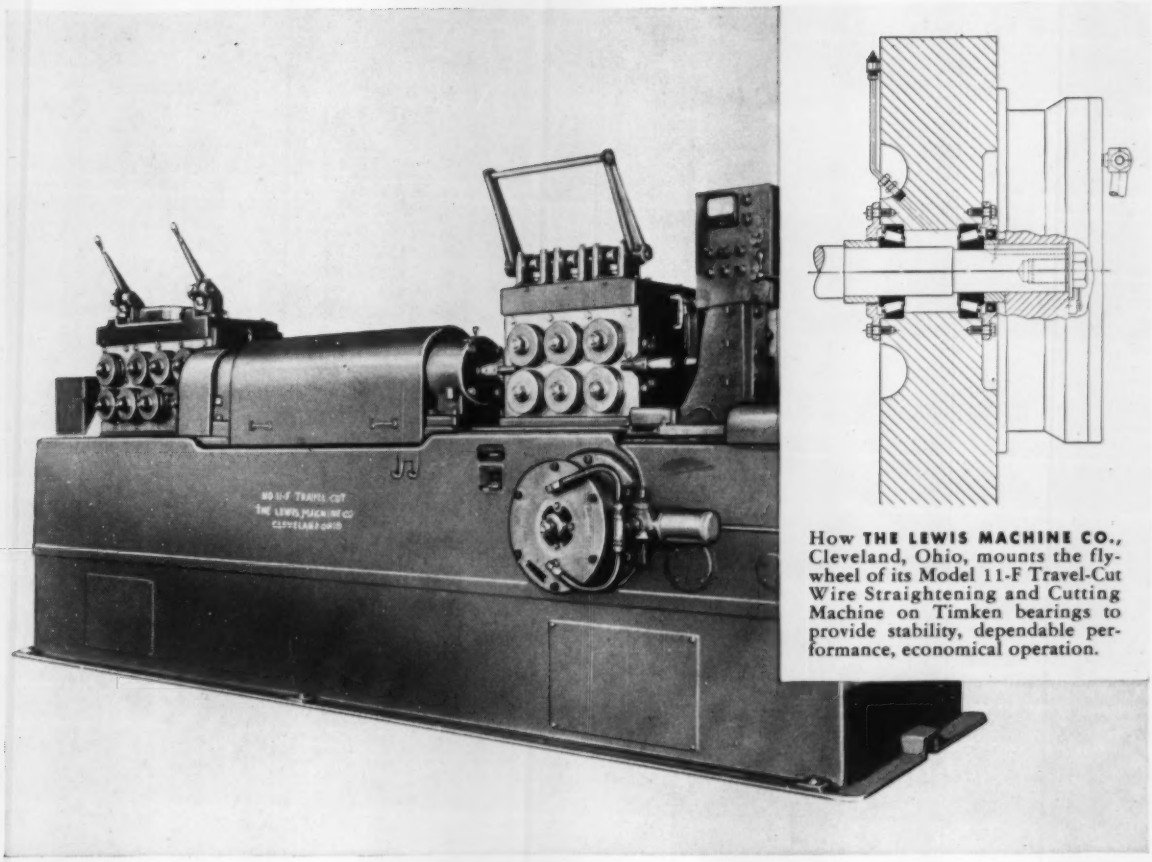


MASTER GEARMOTORS and variable speed drives can be supplied with integrated Unibrakes too. See Master for the perfect power drive for you.

Type M Unibrake

THE MASTER ELECTRIC COMPANY
DAYTON 1, OHIO

MASTER UNIBRAKE MOTORS



How **THE LEWIS MACHINE CO.**, Cleveland, Ohio, mounts the flywheel of its Model 11-F Travel-Cut Wire Straightening and Cutting Machine on Timken bearings to provide stability, dependable performance, economical operation.

How TIMKEN® bearings keep flywheel stable on automatic wire straightening and cutting machine

TO take the varying loads of automatic wire straightening and cutting, the bearings in this Lewis Model 11-F Travel-Cut have to be extra tough and virtually friction-free. That's why The Lewis Machine Company uses Timken® tapered roller bearings for the flywheel, feed rolls and drive—38 in all. Timken bearings keep the flywheel stable and rotating freely, position gears and feed rolls accurately even under heavy loads.

EXTRA LOAD-CARRYING CAPACITY. Full line contact between their rollers and races gives Timken bearings extra load-carrying capacity. Tapered design lets Timken bearings take *both* radial and thrust loads in any combination. The flywheel doesn't wobble. Gears and feed rolls *stay* in position.

PRACTICALLY FRICTION-FREE PERFORMANCE. Because they're geometrically designed to roll true, and precision-made to live up to their design, Timken bearings virtually eliminate friction. They run smoother, last longer.

NO SHOCK PROBLEMS. Because they're case-carburized, Timken bearings' rollers and races have a hard, wear-resistant surface over a tough, shock-resistant core. They *absorb* shocks, reduce maintenance.

That's why it pays to specify bearings trade-marked "TIMKEN". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.